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Thesis Abstract

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Author: Jeremy C. Seals, 2Lt. USAF
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Japan's national security strategy is not engineered primarily to defend the country against military threats, but rather to protect Japan from what it fears most: technological inferiority and economic decline. As a result, military rationale plays a subordinate role to economic concerns in defense planning. In this research I analyzed Japan's national security strategy as it is manifested in three cases of aerospace procurement policy: licensed production of U.S. fighter aircraft, co-development with the U.S. of new fighter aircraft, and indigenous development of a constellation of intelligence-gathering (spy) satellites. I showed how each of these policies demonstrates a conscious choice to sacrifice military utility for the sake of technological advancement in domestic industries. Cutting-edge technology gives Japanese industries their edge in world markets, and losing them represents the ultimate compromise of what Japan defines as national security. Security, from the perspective of Japanese security policy, is not about military strength. It is about the viability of the national economy, the competitiveness of domestic industries, and the strength of the country's technology base. Japan's strategy for preserving its national security is aimed at a threat, but it is not the kind that will likely come flying across the border dropping bombs. The threat is economic decline. Put another way, the threat is technological inferiority that leads to economic decline. The battlefields where Japan's security strategy is put to the test are the marketplaces of the world. If its strategy fails, technologically superior foreign industries will occupy the market both at home and abroad. If it succeeds, Japan will be able to fend off its technological foes in an effort to secure its future economic health.

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SECURING TECHNOLOGY: AEROSPACE PROCUREMENT AND JAPAN'S NATIONAL SECURITY STRATEGY

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UNIVERSITY OF HAWAI`I IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

ASIAN STUDIES

MAY 2000

By
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Thesis Committee:

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Lonny E. Carlile

We certify that we have read this thesis and, in our opinion, it is satisfactory in scope and quality as a thesis for the degree of Master of Arts in Asian Studies.

THESIS COMMITTEE

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Chairperson

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(signatures are on file at the University of Hawaii)

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LIST OF TABLES

LIST OF ABBREVIATIONS

AEW ..... Airborne Early Warning
ALOS ..... Advanced Land Observation Satellite
ASDF ..... Air Self Defense Force
C4I ..... Command, Control, Communications, Computer and Intelligence
CCV ..... Control-Configured Vehicle
DOD ..... Department of Defense (U.S.)
DPC ..... Defense Production Committee (of Keidanren)
FSX ..... Fighter Support Experimental
GAO ..... General Accounting Office (U.S.)
GSDF ..... Ground Self Defense Force
IHI ..... Ishikawajima Heavy Industries
ISIS ..... Institute of Space and Aeronautical Science
JDA ..... Japan Defense Agency
JSC ..... Joint Staff Council
KHI ..... Kawasaki Heavy Industries
LDP ..... Liberal Democratic Party
LEO ..... Low-Earth Orbit
MELCO ..... Mitsubishi Electric Company
MHI ..... Mitsubishi Heavy Industries
MITI ..... Ministry of International Trade and Industry
MOF ..... Ministry of Finance
MOFA ..... Ministry of Foreign Affairs
MOU ..... Memorandum of Understanding
MSA ..... Mutual Security Assistance Agreement
MSDF ..... Maritime Self Defense Force
NASDA ..... National Space Development Agency
NPR ..... National Police Reserve
NSA ..... National Safety Agency
PMO ..... Prime Minister's Office
R&D ..... Research and Development
SCAP ..... Supreme Commander Allied Powers
SDF ..... Self Defense Forces
SDPC ..... Space Development Production Committee (of Keidanren)
STA ..... Science and Technology Agency
TMD ..... Theater Missile Defense
TRDI ..... Technology Research and Development Institute

CHAPTER 1
INTRODUCTION

In this study I attempted to determine if an institutional ideology that gives primacy to economic concerns is the most important determinant of Japan's national security policy in the post-war period. Preliminary indications supported my hypothesis that Japan's strategy for maintaining its national security stems from an ideological tendency for domestic institutions to prioritize acquisition and development of technology over military capability.

While factors such as the international environment and perception of external threats certainly influence Japan's strategic planning, the hypothesis that I tested was that an ideological belief in the preeminence of economic security plays a more important role in shaping Japan's security strategy than those variables. In order to evaluate the effect of ideology on security strategy, I examined security policy outputs in the form three different policies for military aerospace procurement. These policies include licensed production of U.S. fighter aircraft, indigenous development of new aircraft for the exclusive use of Japan's Self Defense Forces, and finally indigenous development of spy satellites. These policy outputs demonstrate a propensity for Japan to procure systems based on their potential value to the competitiveness of domestic industries rather than their value as effective pieces of military hardware.

It is through the interaction of institutions concerned with formulation of security policy, namely the bureaucracy, the Self Defense Forces, the Diet, and business, that Japan's economics-first ideology is able to guide policy outputs like procurement and

thereby shape security strategy. In other words, it is the institutional structure of the Japanese state that allows ideology to function as the primary determinant of its security strategy.

Ideology, as I use the term in this study, refers to a common system of beliefs that informs the behavior of a group. Since ideology helps to define acceptable courses of action, it serves a normative function. In the study of Japan's national security the words *norm* and *ideology* are used interchangeably when referring to shared notions of acceptable behavior. Multiple studies have identified both social and legal norms in Japan that shape security policy, key among them the belief that economic security is more important than military strength.[1]

In a 1987 article Robert Reich tied this kind economic-centered ideology to the acquisition of technology and its relationship to national security. He identified an ideology that he called *technonationalism*, a term that emphasizes the importance of nurturing and protecting a domestic technology base in a country's strategic planning. Reich quoted from a National Security Council report on Japanese technology that linked military and economic vulnerability together, noting that if a nation falls behind technologically "it would also become a less independent, less influential, and less secure

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[1]Peter J. Katzenstein and Nobuo Ōkawara, *Japan's National Security: Structures, Norms, and Policy Responses in a Changing World* (Ithaca: Cornell East Asia Series, 1993). See also Peter J. Katzenstein, *Cultural Norms and National Security: Police and Military in Postwar Japan* (Ithaca: Cornell University Press, 1996).

nation."[2] Technology then, according to this ideology, is not just a means of achieving national security; it can also be an end of national security policy in itself.

In the case of Japan, technonationalism closely coincides with another oft-studied ideology called developmentalism. Developmentalism refers to the tendency of Japanese institutions to value economic development above all other considerations. The model of the capitalist developmental state was derived from studying this ideology at work. Chalmers Johnson, who first explained the model, described developmentalism in Japan:

> [A] state's first priority will define its essence . . . For more than 50 years the Japanese state has given its first priority to economic development. Some of the Japanese state's priorities for economic development, such as the Pacific War, were disastrous, but that does not alter the fact that its priorities have been consistent.[3]

Richard Samuels described how technonationalism, like developmentalism, has been a consistent feature of Japanese policy both before and after the war. He also elaborated the idea of technonationalism by identifying three general tendencies characteristic of the ideology: indigenization of new technologies, diffusion of new technologies throughout the economy, and nurturance of domestic industries that utilize new technologies.[4] Because technology is an element of economic development, the

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[2]Robert Reich, "The Rise of Technonationalism," *The Atlantic Monthly* 259, no. 5 (May 1987): 65.

[3]Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford, Calif.: Stanford University Press, 1982), 305-306.

[4]Richard J. Samuels, *Rich Nation, Strong Army: National Security and the Technological Transformation of Japan* (Ithaca: Cornell University Press, 1994), chap. 2.

technonationalist ideology can be considered a case of the larger ideology of developmentalism.

In this study I analyzed the institutions that influence procurement of defense aerospace systems in Japan and the role of the technonationalist ideology in the procurement process. Since an ideology is a system of beliefs common to a group, analysis of ideological influence requires concurrent analysis of the institutions (groups) that espouse it. For example, in order to determine whether or not technonationalism guides security policy one must examine the institutions that contribute to the policy process. Do they attempt to indigenize, diffuse, and nurture new technologies? Do their actions reflect that these pursuits are paramount to concerns about the international environment or concerns about Japan's physical security? These questions formed the basis of my inquiry.

A Presupposition that an Institutional Perspective is the Optimum Approach for Study of Japan's Security Policy

Modern security studies literature demonstrates that different analytical perspectives can and do lead to significantly different conclusions about the nature of security policy. I considered some of these perspectives before deciding upon the domestic institutional approach that I took in this research.

As a foundation for the study of foreign policy, which includes national security policy, K.J. Holsti identified three general variables that contribute to a sense of national orientation or role. These are 1) external conditions, 2) national attributes, and 3)

ideological or attitudinal attributes.[5] The sense of national orientation that comes from these variables forms the basis of a country's foreign policy. Holsti went on to identify a number of individual elements that help to define these variables, as listed in Table 1. He pointed out that no research has yet been conducted to measure the relative importance of these general variables in the formulation of foreign policy. In terms of international political theory, then, there is no research to support the claim that ideology is more important than other factors in guiding security strategy. This is one of the limits of my study: it makes no claims to theory that can be generalized outside of Japan. What it does claim is that ideology is the most important variable in one case, the case of Japan, an assertion that Holsti argued would be difficult to validate. "It is virtually impossible," he wrote, "to weigh the *relative impact* of the various systemic or national conditions in explaining any particular [foreign policy] orientation. In any given case, all the factors might be relevant, but there is as yet no precise way to measure *how important* each of them is" (italics Holsti's).[6]

While the difficulties Holsti identified certainly exist, they do not invalidate my hypothesis regarding Japan. By careful evaluation of specific policy outputs it is possible to identify trends in security planning even if precise measurement of the influence of various factors on that policy remains impossible. In the case of Japan, the trends point convincingly to a technonationalist ideology that plays the major role in shaping security

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[5]K.J. Holsti, *International Politics: A Framework for Analysis*, 4th ed., (Englewood Cliffs, N.J.: Prentice Hall, 1983), 316.

[6]Ibid., 315.

policy. The procurement policies considered in this study demonstrate that even in the face of significant external threats and despite changes in the international political environment, Japan has procured and continues to procure military aerospace systems based on potential technological benefit rather than military utility.

Table 1. Elements that Contribute to a Sense of National Orientation

General Variable	Individual Elements
1. External conditions	1. Perceptions of threat 2. Major shifts in conditions abroad
2. National attributes	1. Weak or strong capabilities 2. Public opinion and attitudes 3. Economic needs 4. Ethnic composition of state
3. Ideological and attitudinal attributes	1. Traditional policies or roles 2. Public opinion and attitudes 3. Humanitarian concerns 4. Ideological principles 5. Identification with region; compatibility of values with other states

Source: K.J. Holsti, *International Politics: A Framework for Analysis*, 4th ed. (Englewood Cliffs, N.J.: Prentice Hall, 1983), 317.

Scholars who have attempted to describe Japan's security strategy in terms of a generally applicable theory of international politics have often concluded that one of Holsti's variables is more important than the others. Their research has fallen primarily into two categories: one characterized by a realist perspective and one characterized by an institutionalist perspective. Those in the first category have attempted to explain security strategy in terms of balance-of-power politics, or the international distribution of

capabilities, while the second group has looked to institutions, processes, and norms as the sources of Japan's strategy.[7]

The Realist Approach

Paul Viotti described the realist perspective as it relates to security studies as one that is preoccupied with defense concerns. It is a perspective that sees states as unitary, rational actors in an anarchical world competing for power and influence. This competition leads to a balancing of interests, or a "balance of power" in the international environment.[8] Whenever the international environment changes, for example when the bipolar rivalry of the Cold War came to an end, the balance of the entire system shifts. States must modify their approach to security based on the new environment in order to maintain or achieve an advantageous position in the new balance.

In the early 1990s this perspective dominated studies of Japan's security policy. Its popularity is easy to understand. The Cold War, which had been the context for all of Japan's post-war security planning, had recently ended. Realists speculated about how Japan's strategy would evolve to accommodate the new balance of power that was emerging. The issue that dominated most research was how alliance relations with the United States would change as a result of the emerging international environment. As

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[7]Katzenstein and Ōkawara, 4.

[8]Paul R. Viotti, "International Security and the Context of Policy," in *The Defense Policies of Nations: A Comparative Study*, 3d ed., edited by Douglas J. Murray and Paul R. Viotti (Baltimore: Johns Hopkins University Press, 1994), 13.

Holsti has noted, from the time of Thucydides students of national security have recognized the fact that mutual fear (i.e. a common threat) is a necessary condition for a military alliance.[9] With the end of the Cold War, scholars looked for changes in the U.S.-Japan alliance to accompany the demise of the common Soviet threat.[10]

Even before the end of the Cold War, studies of Japan's security policy centered on international determinants of strategy. In a 1984 study titled "Japan's Search for Strategy" Mike Mochizuki traced the history of security policy in post-war Japan and identified what is often called the "Yoshida strategy" as the foundation of that policy. This strategy was an attempt by Prime Minister Yoshida Shigeru immediately after the war to ensure that the United States would bear the burden of defending Japan after the end of the Allied occupation. Yoshida's plan made Japan an important part of the United States' emergent Cold War strategy by allowing the U.S. military to station troops in the archipelago. The U.S., in turn, encouraged its new ally to strengthen its industrial capacity and develop its economy as a means of warding off leftist political influence. Yoshida's strategy was to take advantage of that encouragement in order to maximize economic development.

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[9]Holsti, 107.

[10]For one example see Akira Katō, *Japan's Search for a New Security Relationship: An Analysis of the Changing Determinants of Japan's Security Policy in the Post-Cold War Period*, USJP Occasional Paper 90-02 (Cambridge, Mass.: Program on U.S.-Japan Relations, Harvard University, 1990), 18.

Mochizuki called supporters of the Yoshida strategy and their successors political realists because "their primary concern [was] with the political and diplomatic implications of Japan's security policy."[11]

In addition to the political realists, Mochizuki identified three other schools of thought regarding security within Japan. He called these "unarmed neutralists," "Japanese Gaullists," and "military realists." The first group advocated an unarmed, pacifist foreign policy; the second an independent, militarily strong foreign policy; and the third a foreign policy based on realistic assessment of military threats. Mochizuki concluded that changes in the international environment would be the most important factor in determining which of these groups would exercise the most influence over future security policy.[12]

Akira Katō followed up on Mochizuki's work in 1990 with an assessment of how changes in the international environment had actually affected the security policy debate in Japan.[13] Katō identified four factors that he said interacted to affect Japan's policy orientation: 1) the international system, 2) domestic factors, 3) threat perception, and 4) geostrategic/topographic characteristics.[14] He then analyzed Japan's Cold War-era security policy and made predictions for its post-Cold War policy based on the relative

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[11]Mike M. Mochizuki, "Japan's Search for Strategy," *International Security* 8 no. 3 (Winter 1983-84), 159.

[12]Ibid., 163-179.

[13]Katō, 25.

importance of each factor. He concluded that the international system and threat perception exercise much more influence on security policy than domestic factors. Domestic issues that he did discuss include Article Nine of Japan's postwar constitution, commonly known as the "peace clause" because of its renunciation of war as a sovereign right of the nation, and the economy.[15] Despite the unquestionable influence of those issues on strategy, in Katō's view they were subordinate to the demise of the Soviet Union as a threat and "vast changes sweeping the world toward a more diffuse international system" as determinants of future security policy.[16]

Katō's study demonstrates one of the potential problems of limiting oneself strictly to a realist perspective in the study of Japan's security policy: it can lead to inaccurate conclusions. According to his analysis, the changing nature of the international system after the end of the Cold War and the lack of a viable common threat suggest that Japan will shift its security strategy to de-emphasize military ties with the United States and pursue a strategy of isolationism.[17] In the years since Katō's study, the exact opposite has taken place. Japan and the United States have strengthened their security ties and Japan has made gestures toward greater involvement in international

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[14]Ibid., 3. Holsti identified these factors in an earlier edition of *International Politics: A Framework for Analysis.*

[15]Katō, 5-7.

[16]Ibid., 18-22.

[17]Ibid.

political affairs.[18] Realism is important in that it helps to explain the origins of Japan's security strategy, as Mochizuki showed, but it is insufficient by itself for explaining the postwar evolution of that strategy.

The Institutional Approach

Peter Katzenstein and Nobuo Ōkawara noted the inadequacy of balance-of-power political theory to explain Japanese security policy and took a correspondingly different approach. "Analytical perspectives that focus attention exclusively or predominantly at the level of the international system . . . suffer from serious weaknesses if we wish to understand the security policies of particular states. We are reminded of these limitations by the fact that different variants of [international system] explanations yield contradictory predictions about Japan's security policy," they wrote.[19] Instead of focusing exclusively on the international system, their study included analysis of domestic determinants of strategy. They divided these determinants into two categories: 1) the structure of the Japanese state, and 2) social and legal norms "which help define policy

[18]For example, President Clinton and Prime Minister Hashimoto issued a statement in 1996 dubbed the "Joint Declaration on Security" that re-affirmed the importance of the bilateral security relationship. It encouraged cooperation in dealing with contingencies in "areas surrounding Japan," expanding the scope of the alliance beyond Japan proper for the first time. The statement also called for a comprehensive review of the 1978 Guidelines on Defense Cooperation that spelled out how U.S. and Japanese forces were to work together in the event of a crisis. The Guidelines were revised in 1997 to expand the role of the SDF in joint operations. The Diet passed the revisions in 1999. In 1992 the Diet passed another measure that allows limited participation of the SDF in U.N. peacekeeping missions.

[19]Katzenstein and Ōkawara, 5.

interests and the standards of appropriateness for specific policy choices."[20] A discussion of some of the specific norms they examined follows in the next section.

The conclusions of scholars utilizing this type of institutional approach differ significantly from those favoring a realist perspective. Katzenstein and Ōkawara demonstrated, for example, that institutional inputs to the policy-making process ensure that policy outputs reflect the belief that economic and political aspects of national security are more important than "a forceful articulation of military security objectives."[21] In other words, Japan's security strategy is a representation more of institutional ideologies than a calculated response by the state to military threats. The realist perspective tends to view security policy as just such a rational response, and as a result it largely ignores the influence of domestic institutions and their ideologies. In Japan the institutional perspective provides a much clearer picture of how policy actually develops.

In another institutional study, Michael Chinworth determined that the sheer number of institutions involved in making security policy in Japan indicates that "the government has more than defending against external threats on its mind when developing and implementing specific policy positions."[22] What it has in mind, he showed, is industrial development.

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[20]Ibid., 6.

[21]Ibid., 21.

[22]Michael W. Chinworth, *Inside Japan's Defense: Technology, Economics, and Strategy* (Riverside, N.J.: Brassey's, 1992), 1.

Chinworth analyzed bureaucratic, military, political, and business inputs to the policy process in two aircraft procurement cases and a missile procurement case. He also provided a detailed description of the procurement process in general, by which the Japan Defense Agency (JDA) develops and acquires its weapons. One of the most important characteristics of that process is the relationship between commercial and government agencies, he said. For example, the JDA's close ties with the private sector, which I discuss in the next section, put private companies in a position to shape government policies.[23] Another important feature of the procurement process, Chinworth argued, is that its objective is not to develop and deploy advanced weapons systems. Instead, it has evolved through the interaction of different institutions to "stimulate critical industrial sectors and capabilities across a wide range of applications."[24]

Finally, Chinworth raised an important point about the context of Japan's security strategy. Unlike defense establishments in the United States and other countries, the JDA and the Self Defense Forces (SDF) have an extremely limited mission. They exist only to supplement the security guarantee provided by the U.S.-Japan Treaty of Mutual Cooperation and Security. In addition, the security relationship between the U.S. and Japan has allowed the latter to import and assimilate a wide range of modern weapons technologies.[25]

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[23]Ibid., 32.

[24]Ibid.

[25]Ibid., 32-33.

These points are significant because they explain why Japan is able to pursue a security strategy that gives primacy to economic concerns. It is reasonable to assume that if Japan did not have the U.S. security guarantee then it would be forced to pursue a strategy more responsive to international events and external threats. With the physical protection provided by the guarantee, however, Japan is free to use national security policy as a tool for strengthening its domestic industries. That is the crux of why a strictly realist perspective is insufficient for analyzing Japan's security policy: Japan is insulated from military balance-of-power politics. Insulation allows Japan to pursue a security strategy driven by technonationalist concerns, and as such it is a motive for the country to maintain its security relationship with the United States. The benefits of isolation help explain why the relationship has strengthened after the Cold War despite the realist contention that "no alliance can persist without the perception of a common threat."[26]

In a 1993 study, Wayne Robinson further articulated advantages of an institutionalist perspective in the study of Japan's security. He addressed realist studies of security policy (procurement policy) as follows: "The theoretical literature dealing with military expenditure has tended to view the state as a rational actor which balances effort, cost, and security benefits to maximize national interests. This, however, tends to

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[26]Katō, 18.

obscure important political functions served by military spending. . . . Further, it has diverted attention from the role of private interests."[27]

He went on to suggest that Japan's procurement policies could be better understood within the context of a framework proposed by Mary Kaldor in 1986. In this highly theoretical framework, Kaldor separated military procurement into a demand-side constituency and a supply-side constituency, the first comprised of military planners and the second comprised of developers and commercial interests. These two sides interact competitively to produce policy, with the outcome of their competition determined more by "state-bureaucratic interests" than by "hypothetical security threats."[28] The reason is that during peacetime, as Kaldor explained, state support of military enterprises is independent of military requirements since there is no immediate need to employ military hardware. The state must seek some other rationale for weapons procurement. Robinson interpreted Kaldor's theory to mean that certain companies become bearers of "industrial culture" that "cannot be allowed to falter for reasons of national security."[29] Put another way, state institutions offer support (in the form of procurement contracts) to firms that they deem important to maintaining security. If institutions prioritize economic and

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[27]Wayne Robinson, *Political Aspects of Japan's Defence Procurement* Papers of the Japanese Studies Centre no. 17 (Melbourne: Japanese Studies Centre, 1993), 3.

[28]Mary Kaldor, "The Weapons Succession Process," *World Politics* 38, no. 4 (July 1986): 577-595, cited in Robinson, 3-6.

[29]Ibid.

technological security over military security, then that priority will be reflected in procurement policy.

For practical purposes, the U.S. security guarantee allows Japan to exist in a state of perpetual peace. This means that according to Kaldor's model, state-bureaucratic interests (institutions) should always moderate the security policy debate in Japan and threat perception should be a less significant policy determinant than whatever is important to institutions. This is accurate to the extent that relations with the United States are conducive to the policy process. As I show in chapter three, the same bilateral relationship that allows Japan to remain insulated from concerns about threats also leaves its security policy susceptible to U.S. interference.

A Presupposition that Bureaucratic Decision Making Results in Policies that Reflect Japan's Economic Definition of National Security

In an introductory essay to a comparative study of national defense policy, Paul Viotti noted that the term *security* is multidimensional. "Security can be understood both as a defense against external (or internal) threats as well as the overall socioeconomic well-being of a society and the individuals who compose it."[30] Despite the broad scope of issues contained within the term, writers often use *security policy* interchangeably with the narrower term *defense policy*. It is important to make a distinction between the two, however, as Viotti pointed out: "Specifying this distinction between security, the more inclusive term, and defense, a component of security, is more than semantics. Defense

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[30]Viotti, 1.

spending, for example, may contribute to security by deterring would-be adversaries–making attacks by them less likely. Economic benefits from defense spending would include increased employment of domestic labor forces and the development of new, nonmilitary industries based on commercial 'spin-offs' from emergent defense technologies."[31]

Differentiating between security and defense is especially important to Japan's definition of national security. The shield provided by the United States (which might be more appropriately called a *defense* guarantee than a security guarantee, since it is concerned strictly with military protection) has permitted the development of a consensus in Japan on constraining defense and focusing on other aspects of security. Within the context of the bilateral alliance Japan has been able to avoid serious involvement in military security issues and international power politics while concentrating on economic issues.[32]

Ascendancy of Economic Security Issues

In keeping with its insulated position, Japan's post-war definition of national security de-emphasizes the military component of the term. It is a definition that has evolved within policies and strategic pronouncements, always shaped by the underlying

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[31]Ibid., 4.

[32]Joseph P. Keddell, Jr., *The Politics of Defense in Japan: Managing Internal and External Pressures* (Armonk, N.Y.: M.E. Sharpe, 1993), 9.

ideology of technonationalism. In July 1980 the government formalized this definition in a report on *sōgō anzen hoshō,* or comprehensive national security. The report, issued by a study group commissioned by Prime Minister Ōhira Masaharu, attempted to identify Japan's key security interests. Ōhira described his vision of comprehensive security as a strategy that would be "concretely realized . . . not by military power alone but through the linked support of economic power, information, political power and diplomacy."[33] In downplaying the role of the military and focusing attention of the comprehensive nature of strategy, the study group provided a framework for translating economic issues into issues of national security. As Michael L'Estrange put it, the report made security a national concern instead of a military one.[34]

In a study of the comprehensive national security concept, Robert Barnett interpreted the study group's report as Japan's acknowledgment that the foundation of its national security is economic vitality. "Administration of a stable, growth-oriented, and reliably outward-looking/interdependent economic system is the bedrock of Japan's own security and by far Japan's greatest contribution to the security of other countries in the East Asian region."[35] Development of its strong position in that system and maintenance

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[33]*Asahi Shimbun*, 2 December 1978, quoted J.W.M. Chapman, R. Drifte, and I.T.M. Gow, *Japan's Quest for Comprehensive Security: Defense, Diplomacy, Dependence* (New York: St. Martin's Press, 1982), *xvi*.

[34]Michael G. L'Estrange, *The Internationalization of Japan's Security Policy: Challenges and Dilemma for a Reluctant Power* (Berkeley: Institute of International Studies, University of California, 1990), 17, cited in Katzenstein and Ōkawara, 106.

[35]Robert W. Barnett, *Beyond War: Japan's Concept of Comprehensive National Security* (New York: Pergamon-Brassey's, 1984), 10.

of that position have been the basis for Japan's national security strategy for the entire post-war period.

Japan's post-war emphasis on economic security began with the previously mentioned Yoshida strategy. While assuring that the U.S. would provide for Japan's physical security, as Mochizuki noted, it also allowed the Japanese government to focus virtually all of the country's resources on industrial and economic growth. This focus on economic development was not simply an effort to "get rich," but represented a widely accepted societal norm, an ideology, which holds that economic security is the most vital condition for national survival. This norm affected Japan's foreign policy in both the pre- and post-war eras. In the former, military expansionism was used to try and ensure access to resources and markets that would support Japanese industry. In the latter, the Yoshida strategy and its successors like *sōgō anzen hoshō* altered the means of industrial support but maintained the same objectives.

Katzenstein and Ōkawara argued that the norm of prioritizing economic security is virtually uncontested in Japan. They said that citizens and policy makers agree that economic security is of paramount importance to Japan because of the country's dependence on foreign sources of energy and raw materials. The result is that Japan's security debate is often caged in strictly economic terms without regard for military strategy or defense rationale.[36]

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[36]Katzenstein and Ōkawara, 102-105

Technonationalism is one manifestation of this emphasis on economic security. "Technology is desirable because it opens up the prospect for sustained, long-term growth. And it may also help to reduce Japan's economic vulnerability by pointing to a future of sustained economic growth less dependent on importing raw materials."[37] David Friedman and Richard Samuels concluded that regardless of whether new technologies are civilian or military in nature is not as important as whether technologies are indigenized, diffused, and nurtured to support industry: "Inidigenization, diffusion, and nurturing all combine the belief that Japan is more secure when it achieves independent scientific and technological capabilities to design, manufacture, and innovate."[38]

Institutional Roles in the Security Policy Process

Given the ideological predisposition in Japan to prioritize economic issues above defense in defining national security, the next question is how that predisposition finds its way into actual security policy. It is here that the structure of the Japanese state is important because it allows institutionalized norms to preclude other factors, such as external military threats, in the formation of policy. Norms are institutionalized when they become attached to specific organizations within society, defining acceptable courses

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[37] Ibid., 103.

[38]David Friedman and Richard J. Samuels, *How to Succeed Without Really Flying: The Japanese Aircraft Industry and Japan's Technology Ideology* (Cambridge. Mass.: M.I.T. Japan Program, Center for International Affairs, Massachusetts Institute of Technology, 1992), 6, quoted. in Kaztenstein and Ōkawara, 103.

of action and regulating organizational behavior. In Japan the primary institutions concerned with the formation of security policy are the 1) the bureaucracy, specifically the Ministry of Foreign Affairs (MOFA), the Ministry of Finance (MOF), the Ministry of International Trade and Industry (MITI), and the JDA; 2) the SDF; 3) the Diet; and 4) the business community.

Katzenstein and Ōkawara described the interaction of these institutions in the security policy process, particularly the interaction of different bureaucratic agencies. While agencies vie with one another for influence in the policy process, they argued that an uncontested norm underlies all bureaucratic rivalry: the notion that Japan should reduce its economic vulnerability and increase its technological autonomy. This uncontested norm differs, they argued, from highly contested norms that inform the debate over defense policy.[39]

With an uncontested norm of economic security as their guide, bureaucratic agencies work to implement their individual agendas through security policy. While those agendas often conflict, economic security is always their ultimate goal. For example, MOFA is the ministry responsible for articulating Japan's overall security policy, but its agenda often conflicts with those of other ministries because it views anything that threatens Japan's diplomatic relationship with the U.S. as an impediment to national security. Maintenance of the U.S.-Japan military alliance is MOFA's primary security concern, and this emphasis on bilateral relations often causes the ministry to take

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[39]Katzenstein and Ōkawara, 6-7.

a stand that appears to run counter to the goal of economic security (MOFA's opposition to domestic production of the FSX fighter jet, which I discuss in chapter three, is a case in point). As Michael Chinworth pointed out, however, MOFA sees the U.S.-Japan relationship as a necessary precondition for economic security. The practical result of MOFA's approach to security, he wrote, "is that it achieves security for the country by controlling political frictions and thus retaining access to important economic markets, enabling Japan to remain prosperous and independent."[40]

MITI, on the other hand, is primarily concerned with Japan's industrial development. As the ministry responsible for international trade, it is centrally involved in issues of economic security and also plays a role in military security by overseeing technology transfers and the export of so-called "dual-use" items, which are products or technologies that can be used in both civilian and military applications. Despite its ties to military security, however, MITI's policy preferences are characterized by a lack of concern with military issues. Instead of basing policy on the needs of the SDF, the agency "pays close attention to the prospective recipients of Defense Agency contracts and carefully reviews each, especially where licensing is involved, to determine its likely impact upon industrial development."[41]

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[40]Chinworth, 14.

[41]Kataoka Tetsuya and Ramon H. Myers, *Defending and Economic Superpower: Reassessing the U.S.-Japan Security Alliance* (Boulder: Westview Press, 1989), 66., quoted. in Katzenstein and Ōkawara, 33.

The Ministry of Finance, like MITI and MOFA, considers itself to be the guardian of Japan's economic security. To the MOF, security in its broadest sense means fiscal soundness. After all, noted Chinworth, "Without a stable government and sound fiscal policy, it would be impossible to have any domestic economy at all, much less a defense establishment."[42] This means that the MOF advocates policy options that minimize spending on defense to the extent that such spending does not have a beneficial effect on the domestic economy. The MOF has been one of the primary forces that has constrained defense spending to a level of around one percent of Japan's GNP since the early 1960s.

The JDA, unlike MOFA, MITI, and the MOF, is not a full-fledged ministry. It occupies the position of a government agency, which it shares with eleven other organizations that are all under the supervision of the Prime Minister's Office (PMO). This diminished status places the JDA in a semi-subordinate position, denying it the autonomy enjoyed by the ministries. In fact, the JDA's status as an agency has led to a system of "occupation" of many of its key positions by career bureaucrats from MOFA, MITI, and MOF. This is important because it prevents the development of career JDA bureaucrats with military expertise and a sense of institutional loyalty. Oftentimes the bureaucrats who fill posts at the JDA are temporary transfers from the ministries who have little or no interest in military strategy or policy, but remain interested in pursuing the agenda of their parent organizations. For example, a MOFA official on temporary assignment traditionally fills the JDA position of Councilor on International Affairs, a

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[42]Chinworth, 20.

high-level post within the Defense Policy Bureau that oversees military intelligence. Likewise the Equipment Bureau chief, whose office oversees procurement for the SDF, is a MITI official on a two-year rotation.[43] The MOF makes its presence known within the JDA through the director general of the Finance Bureau, a former MOF bureaucrat who, unlike officials from the other ministries, often serves for an extended period in the JDA.[44] The real power in the JDA lies in these internal bureaus, the *naikyoku*, which are controlled by external bureaucratic interests. In addition to shaping policy preferences, the *naikyoku* also oversee the actual administration of the SDF.[45]

The uniformed services themselves, comprised of the Air, Ground, and Maritime Self Defense Forces (ASDF, GSDF, and MSDF, respectively), exercise relatively little influence in the security policy-making process. The SDF organization that possesses the most power in terms of policy making is the Joint Staff Council (JSC), comprised of the chiefs of staff of the three military services and a chairman who is the highest-ranking uniformed officer in Japan. The JSC is the primary decision making body of the SDF, as well as the top military advisory board to the JDA. As Chapman, Drifte, and Gow reported, however, the JSC has virtually no ability to influence actual policy decisions. "Essentially it supplies military data to civilian bureaucrats who then formulate policy,"

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[43]Kaztenstein and Ōkawara, chap. 3.

[44]Chinworth, 20.

[45]Chapman, Drifte, and Gow, 39.

they wrote.[46] The subordination of high-ranking military professionals to relatively low-level bureaucratic control (the *naikyoku*) is rooted in post-war Japan's perception that civilian control of the military must be maintained at all costs.[47] Bureaucratic micro-management is justified as "civilian control," further diminishing the status of the JSC and defense issues in Japan's overall security planning.

The Diet, dominated for almost the entire post-war period by the Liberal Democratic Party (LDP), has contributed to constraints on security policy and broad policy guidelines, but by and large avoided involving itself in details.[48] Its primary role has been to incorporate pacifist sentiment, which permeates Japanese society, into general policy goals. While specific policies have been the domain of the bureaucracy, a legislative system based consensus-building in the Diet has ensured that a variety of voices, including minority voices like that of the Socialist Party, are not ignored in the policy process.[49] For the most part, however, Diet members tend to shy away from active involvement in security issues, particularly those related to defense. This aversion stems from the fact that defense is not an area in which Diet members can secure wide constituent support and re-election.[50] Since defense contracts account for only a fraction of commercial manufacturing (less than one-half of one percent), there is not a powerful

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[46]Ibid., 42-45.

[47]Ibid., 40.

[48]Katzenstein and Ōkawara, 52-53, 60-65.

[49]Ibid., 62.

motivation for politicians to create the kind of pork-barrel legislation that characterizes other policy areas like public works. In the words of Ōtake Hideo, "Few Dietmen, if any, have an electoral district with a large armament industry. Unlike their American counterparts, defense Dietmen in Japan are not connected to defense corporations and related unions in their home districts."[51] This is not to say that politicians ignore security, however. There is a defense policy "tribe" (*zoku*) in the Diet that takes an interest in security issues, but unlike other *zoku* that function as mediators between ministries and well-organized client social groups, the defense *zoku* has no real social constituency. In addition, its members often join the tribe by chance (those chosen, often reluctantly, to serve as director of the JDA for example) rather than by virtue of their knowledge of defense issues. The defense *zoku* is thus one of the most unpopular policy tribes in the Diet.[52]

Despite the unpopularity of defense issues, the Diet does tend to take them up as a reaction to external forces. Two recent examples include a debate over new guidelines governing joint SDF-U.S. military operations in 1998-99 under pressure from the United States, and a debate over Japan's role in U.N. military and peacekeeping operations (PKO) in 1992 following international criticism of Japan's contribution to the Gulf War.

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[50]Chinworth, 21.

[51]Ōtake Hideo, *The Politics of Defense Spending in Conservative Japan*, Peace Studies Program Occasional Paper no. 15 (Ithaca: Cornell University Press, 1982), 18, quoted in Katzenstein and Ōkawara, 18.

[52]Katzenstein and Ōkawara, 60-65.

The final player in the security policy process, especially important to the procurement process, is Japan's business community. As noted earlier, Japan's defense production accounts for only a small percentage of the country's total industrial output. The actual figure is somewhere around one half of one percent, meaning there is clearly no well-developed military-industrial complex in Japan.[53] Businesses that produce systems for the JDA take defense production quite seriously, however, if not for its profitability for the opportunity to develop manufacturing technology and know-how. The primary institution in the business community that influences security policy is the Defense Production Committee (DPC) of Keidanren, the Federation of Economic Organizations. The DPC works closely with both MITI and the JDA to advance its goals of 1) increasing the research and development (R&D) budget of the JDA, 2) increasing the domestic content of SDF systems, and 3) securing long-term commitments in government contracts.[54] MITI and the DPC typically share the objective of increasing domestic production of weapons systems (*kokusanka*), and the JDA tends to side with industry on most issues as well.

The relationship between the JDA and the business community is unique and constitutes an important aspect of defense procurement in Japan. The JDA is highly dependent upon the private sector for its acquisition of new technologies because of a limited budget for defense research and development. Accordingly, the R&D arm of the

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[53]Chinworth, 190.

[54]Katzenstein and Ōkawara, 75.

JDA (the Technical Research and Development Institute or TRDI) depends on the incorporation of commercially developed technologies in military projects. It also tends to provide financial support to private sector research projects that do not have overt military utility, with the intention of applying the technology to defense applications after development. This explains the DPC's support for increased R&D budgets in the JDA, since that money leads directly to advances in commercial technology.[55] The relationship is unique because it means that commercial technology, rather than military technology, constitutes the cutting edge of systems development. It is different from other countries, namely the U.S., that invest heavily in military R&D and then "spin-off" technologies to the private sector. In Japan the R&D process is characterized as "spin-on," and it makes the JDA extremely conscientious of "industry's ability and willingness to continue participating in defense markets."[56]

All of these institutions constitute the players in a dynamic process that shapes Japan's security policy. The primary roles and characteristics of each of the institutions are summarized in Table 2.

Method

In order to test my hypothesis, I analyzed three different cases of military procurement. I limited my study to cases of aerospace systems procurement for two reasons. First, the aerospace industry (meaning the industry that produces both aircraft

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[55]Chinworth, chap. 2.

Table 2. Primary Roles and Characteristics of Institutions Involved in the Security Policy Process

Institution	Primary Role	Characteristics
Ministry of Foreign Affairs (MOFA)	Promote overall security; manage security treaty	Views healthy relations with the U.S. as most important component of security
Ministry of Finance (MOF)	Administer sound fiscal policy	Favors minimum necessary defense
Ministry of International Trade and Industry (MITI)	Promote development of domestic industry	Little interest in defense; tends to favor kokusanka of military systems because of benefits to industry
Japan Defense Agency (JDA)	Direct the SDF and administer defense policy	Occupied by ministries; little autonomy; heavily dependent on private sector R&D
Self Defense Forces (SDF)	Provide primary defense of the Japanese islands	Subordinate to bureaucracy; expertise largely ignored
The Diet	Create and pass legislation	Defense issues are unpopular; a forum for incorporating pacifist sentiment in security policy
Business	Produce military systems	Supports increased domestic content; close ties with MITI and the JDA

Source: Compiled from various sources.

and spacecraft) in Japan produces many of its products for national defense. It is therefore an ideal place to analyze the impact of different forces on procurement policy such as threat perception, U.S.-Japan security relations, SDF requirements, and

[56] Ibid., 31.

technonationalism. Second, the aerospace industry represents the ultimate form of high-technology production. It is a technology-driven field that provides an ample number of cases for analysis of technonationalist influence.

The first case that I analyzed was licensed production of U.S. aerospace systems by Japanese firms for the JDA. This study comprises chapter two. I focused on license-produced fighter aircraft, notably the F-86, F-104, and F15, because they involve more technology than other types of systems. The second case I examined, in chapter three, concerned Japanese efforts to develop indigenous fighter planes, an effort that led to joint U.S.-Japan development of a new aircraft for the exclusive use of the ASDF. This project was known as the FSX in its developmental stage and is now known as the F-2. It was unique because it resulted in a completely new aircraft rather than a domestically produced foreign design as was the case with licensed production, and it demonstrated the influence of the United States on Japan's security policy. The final case that I studied was a plan for Japanese-developed spy satellites to be deployed by 2003. This study is in chapter four. It is significantly different from the other two cases because 1) it involves a different sector of the aerospace industry, and 2) it considers the expanding realm of Japan's security strategy outside of the earth's atmosphere.

In each of these cases I utilized the following framework for analysis: First, I examined the historical background and context for each of the procurement policies under consideration. Next, I examined the roles of bureaucratic ministries and agencies, the SDF, politicians, business interests, and the United States in the development of each policy. Finally, I assessed whether the decisions to procure the systems under

consideration constitute an attempt to incorporate the technonationalist ideology into security policy. In the concluding chapter I summarized my findings and considered the broader implications of each of these policies on Japan's overall strategy for national security.

CHAPTER 2
LICENSED PRODUCTION

In the previous chapter I introduced the institutional players that determine Japan's military aerospace procurement policy and proposed that institutions which prioritize technology acquisition over military utility guide the procurement process. In this chapter I will examine the post-war resurrection of Japan's aerospace industry and consider the procurement of military aircraft for the ASDF based on licensed production of U.S. systems. In the first section I review the historical context of licensed production, tracing the development of Japan's post-war military aircraft industry. In the second section I examine the influence of institutions and ideologies on procurement policy in specific cases of licensed production and compare that influence with other factors, such as threat perception, that affected procurement policy. I conclude that cases of licensed aircraft production demonstrate Japan's tendency to emphasize technology and industrial competitiveness over military capability in its national security planning.

The Historical Context of Licensed Aircraft Production

Japan's sophisticated wartime aircraft industry emerged from World War II with many of its facilities and resources flattened by the Allies' relentless bombing campaign.[1]

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[1]During the period of peak wartime production, Japanese aircraft manufacturers produced 25,000 airframes and 40,000 engines per year. See David C. Mowery and Nathan Rosenberg, "The Japanese Commercial Aircraft Industry since 1945: Government Policy, Technical Development, and Industrial Structure," occasional paper of the Northeast Asia–United States Forum on International Policy (Stanford, Calif.: Stanford University Press, April 1985), 9.

More damaging to the industry than the physical destruction of bombs, however, was General Douglas MacArthur's Directive Number 3 in September 1945. MacArthur's order stopped all flights of Japanese aircraft, banned all research, development, and production of aircraft, and eventually abolished all governmental bodies concerned with aviation. Even model airplanes were forbidden.[2] In January 1946 SCAP (Supreme Commander Allied Powers, General MacArthur's title but used to refer to the occupying forces) took formal control of Japan's aircraft plants. As the occupation progressed, it also worked to dismantle the giant industrial collectives (*zaibatsu*) that had been responsible for Japan's aircraft production.

While SCAP was doing its best to insure that the Japanese aerospace industry would never produce another plane, the industry was taking off throughout the rest of the world. The late 1940s constituted the beginning of the jet age, a period marked by revolutionary advances in aerospace technology that resulted in increasingly complicated military and civilian aircraft. New materials, structures, propulsion systems, avionics, life support systems, and armaments all contributed to the growing complexity of aircraft production. Entry into the field became all but impossible for firms without significant design experience and specialized knowledge of high-tech subsystem integration, not to mention massive budgets for research, development, and training.

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[2]Michael J. Green, *Arming Japan: Defense Production, Alliance Politics, and the Postwar Search for Autonomy* (New York: Columbia University Press, 1995), 30. See also Samuels, *Rich Nation*, 199.

Japan's aeronautical engineers and aerospace technicians, isolated from this rapid development of their trade, spent the first crucial years of the jet age literally designing bicycles and fire extinguishers for manufacturing firms that were created from the fragments of broken *zaibatsu*.[3] Without the experience necessary to produce modern aircraft, they found themselves in desperate need of assistance if they were ever going to revive their industry after SCAP lifted its restrictions on aircraft production in April 1952. That assistance was readily forthcoming from the United States, Japan's new strategic ally and ironically the key to resurrecting its defense industries.

Resurrection of the Aircraft Industry

The occupation reversed its course in 1948-49 and began to view Japanese industry, in particular the defense industry, as a potential source of support for the emerging U.S. policy of containing Communism in Asia. As a result of that shift, which was intended to fortify Japan's economy in order to create a stable ally, SCAP ceased its dissolution of the *zaibatsu* and paved the way for the largest aerospace companies to reconstitute themselves by 1964.[4] In the first part of 1952 alone 314 aircraft factories that

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[3]Samuels, *Rich Nation*, 133.

[4]For a description of each of the major aircraft companies in postwar Japan see G.R. Hall and R.E. Johnson, *Aircraft Co-Production and Procurement Strategy*, R-450-PR (Santa Monica: Rand, 1967), 61-73.

had been closed and taken over by SCAP were suddenly returned to Japanese manufacturers.[5]

The outbreak of the Korean War in June 1950 supported the reverse course and became the single most important external event in the rebuilding of Japan's aircraft industry. With the outbreak of war, study teams from the U.S. visited Mitsubishi, Fuji, Kawasaki, and Shōwa Aircraft in order to assess their potential to provide repair and overhaul services for U.S. fighter aircraft that were seeing action across the Tsushima Strait.[6]

The F-86 was America's top-of-the-line aircraft in Korea at the time and it represented all of the technological advances that Japanese aircraft manufacturing firms had forgone during the occupation. Within two years of the outbreak of war, the major Japanese aircraft firms had orders for over two-million man hours of repair and overhaul work on the F-86 and other aircraft, giving the technology-starved industry its first experience with jet propulsion. That service, as well as procurement of domestically manufactured parts in Japan by U.S. forces, constituted the rebirth of the aircraft industry from the period 1950-1954. By one account, U.S. military procurement amounted to some 70 percent of Japan's total exports during the first two years of the period, indicating that the aircraft industry was not the only sector that benefited from the Korean

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[5]Reinhard Drifte, *Arms Production in Japan: The Military Applications of Civilian Technology* (Boulder: Westview, 1986), 9.

[6] Samuels, *Rich Nation*, 201.

war.[7] In fact, the so-called "special procurement" generated by the war provided a massive stimulus to the entire Japanese economy, so much that the government designated the weapons industry a major "national policy sector" in 1952. This gave MITI the power to exercise coordinated industrial policy by selecting firms that could participate in arms production and providing them with subsidies, tax breaks, and financing aimed at developing the industry.[8]

Another important effect of the Korean war was General MacArthur's order for the Japanese government to create a National Police Reserve (NPR) force to help keep the peace in Japan while U.S. soldiers rotated to the war front. The order came on July 8, 1950 and established a 75,000 man force that was ostensibly for the express purpose of enforcing domestic law. By the end of the occupation, this "police" force was armed with machine guns, mortars, bazookas, flame throwers, artillery, tanks, and was close to obtaining aircraft.[9] Prime Minister Yoshida Shigeru, arguing on the grounds that Article Nine of Japan's postwar constitution forbid rearmament as part of the ability to wage war, consistently opposed transformation of the NPR into a military force or its characterization as such until it became clear that U.S. economic assistance would be tied

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[7] Laura Hein, *Fueling Growth: The Energy Revolution and Economic Policy in Postwar Japan* (Cambridge, Mass.: Harvard East Asian Monographs, 1990), 228, cited in Samuels, *Rich Nation*, 133.

[8]Michael Schaller, *Altered States: The United States and Japan Since the Occupation* (New York: Oxford University Press, 1997), 55-56. See also Drifte, 9-10.

[9]John Dower, *Empire and Aftermath: Yoshida Shigeru and the Japanese Experience, 1878-1954* (Cambridge, Mass.: Council on East Asian Studies, Harvard University, 1979), 384.

to some level of Japanese rearmament. Yoshida's position gradually changed to accommodate U.S. demands.[10]

In 1951 Japanese rearmament received a kind of official status with the conclusion of a security treaty with the United States, signed just eight hours after the San Francisco Peace Treaty that formally ended the Pacific War. The bilateral treaty called on Japan to "increasingly assume responsibility for its own defense against direct and indirect aggression."[11] It entered into force with the peace treaty after being ratified by the Diet on April 28, 1952.[12]

Reacting to the security burden placed on Japan by the treaty, Yoshida's government reorganized and expanded the NPR into the National Safety Agency (NSA) in October 1952. Yoshida indicated that while the new organization did not constitute a remilitarization of Japan, it did lay the groundwork for a future military.[13] The mission of Japan's new forces was not explicitly defined in terms of national security until July

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[10]Ibid., 373-400.

[11]George R. Packard III, *Protest in Tokyo: The Security Treaty Crisis of 1960* (Princeton: Princeton University Press, 1966), 6.

[12]The Treaty of Mutual Cooperation and Security replaced the 1951 security treaty in 1960. Packard outlined six controversial issues in the original treaty that changed in the 1960 version (which remains in effect): 1) the treaty gave the U.S. extensive rights in Japan, but did not obligate it to defend the Japanese islands; 2) lack of a time limit on the treaty (the 1960 treaty established a mechanism for abolishing the relationship every ten years); 3) a stipulation that allowed the U.S. to intervene in internal Japanese disturbances; 4) the right of the U.S. to deploy Japan-based troops anywhere in the Far East without consulting Tokyo; 5) the treaty's failure to address nuclear weapons; and 6) the treaty's failure to explicitly require the U.S. to abide by the U.N. charter. See Packard, 47.

[13]Dower, 438.

1954, when the NSA was transformed into the Japan Defense Agency and the Self-Defense Forces were organized in air, ground, and maritime components. With the creation of the JDA and SDF the government openly established that its new forces were to provide defense "against direct or indirect aggression."[14]

In March 1954 the United States and Japan added a new dimension to their security relationship by signing the Mutual Security Assistance Agreement (MSA). Based on the Mutual Security Assistance Act passed by Congress in 1951 that allowed the U.S. to provide money and arms for allies willing to improve their indigenous defenses, the agreement paved the way for American technical and financial assistance to bring the new Self Defense Forces up to fighting strength.[15] The purpose of the agreement was to provide military technology for the resuscitation of Japan's defense industries, but it was clearly aimed at enhancing Japan's overall industrial capacity as well. Article I states:

> Each Government, consistent with the principles that economic stability is essential to international peace and security, will make available to the other . . . such equipment, materials, services, or other assistance as the Government furnishing such assistance may authorize.[16]

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[14]Ibid.

[15]Schaller, 64-66.

[16]Quoted in Drifte, 11. For the full text of the MSA, see Japan Center for International Exchange, *A Handbook on Japanese Foreign Policy and Security* (Tokyo: 1978).

The United States came to emphasize the reciprocal nature of the agreement in later years, but at the time it was concluded the MSA was strictly a means for the U.S. to provide aid to Japan. Annex A reads:

> In carrying out the present Agreement, the Government of the United States of America will give every consideration . . . to procurement in Japan of supplies and equipment to be made available to Japan, as well as to other countries, where feasible, and to providing information to and facilitating the training of technicians from Japan's defense related industries. In this connection, representatives of the Government of Japan stated that the development of Japan's defense capacities will greatly be facilitated if the Government of the United States of America will give consideration to assisting in the financing of Japan's defense-production industries.[17]

The effect of the MSA was to license importation to Japan of "any U.S. technology that could be justified on grounds of national (or economic) security."[18] Together with the creation of the SDF and the JDA the same year, the MSA became a milestone in the history of postwar Japanese industry and the development of the technonationalist paradigm by opening the door to licensed production of high-tech U.S. equipment, diffusion of imported technology throughout the economy, indigenization of that technology, and the nurturing of new sectors of the industry.

Licensed Production Defined

Japan faced three alternative means of procuring weapons for the newly created Self Defense Forces in 1954, the same alternatives that Hall and Johnson noted all

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[17]Ibid.

[18]Samuels, *Rich Nation*, 151.

countries face when seeking to procure new military hardware: they could design and produce their own systems, purchase ready-made systems from foreign manufacturers, or engage in licensed domestic production of foreign-designed systems.[19] Guided by a technonationalist ideology that came to view transfers of U.S. aerospace technology as a stepping stone to greater technological independence, and with open encouragement and financial support from the U.S. government under the newly signed MSA, Japan chose licensed production as its first major procurement strategy for the Air Self Defense Force.

Licensed production is essentially a transfer of technology from one firm to another. The core of licensed production involves either the transfer of physical components, i.e. plans, tools, patents, and process information, or an exchange of personnel. In their study of U.S. transfers of aerospace technology to Japan during the 1950s and 60s, Hall and Johnson observed that all knowledge about technological advancements is embodied in either "something or somebody," the form being an important consideration in determining the transfer process. When technology is contained within people's expertise, personnel exchange may be necessary in the form of a technical assistance program. In other cases, it may suffice for one firm to provide a knock-down model for another firm to reverse engineer. In any case, they noted, the cost of the transfer (and thus the cost of licensed production) always depends upon the level of industrial skill that the recipient firm already possesses.[20] In the case of Japan's

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[19]G.R. Hall and R.E. Johnson, *Transfers of United States Aerospace Technology to Japan*, P-3875 (Santa Monica: Rand, 1968), 76.

[20]Ibid., 4.

aerospace industry, pre-war and wartime aircraft production insured that the skill level of engineers and technicians was high, even if they had been out of the aircraft business for a number of years after the war.

The first step in the actual execution of any licensed-production program is identification of a system to be produced and a prime contractor to produce it. After selection of a system and a prime contractor, treaties, contracts, and licenses must be concluded to indicate specifically "the technology to be transferred, the payment for the technology, and the goods and services required to transfer it, and the payment for any other goods and services required to produce a finished product."[21] These arrangements are not only between licensor and licensee firms, they also involve the respective governments. If cost sharing is involved as a form of military aid, for example, governments must agree on the terms at this stage. Actual licenses are issued for the integrated aircraft design (licensed to the prime contractor) as well as rights and data for all necessary systems produced under subcontract.[22]

An Institutional Framework for Licensed Production

Japan's industry leaders began hatching plans to license military aircraft production as a means of increasing their technological competitiveness as early as 1951,

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[21]Hall and Johnson, *Aircraft Co-Production and Procurement Strategy,* 76-77.

[22]The F-86F and T-33A, for example, involved licenses for some 25 subcontracting firms in addition to the prime contractors Mitsubishi and Kawasaki.

when Keidanren organized the Working Group on U.S.-Japan Economic Cooperation. This group lobbied for Japanese rearmament and U.S. economic assistance as a means of transforming Japan into the "arsenal of Asia," a goal that included the attendant benefits of industrial development.[23] In actuality, industry leaders did not care so much about the level of Japan's military strength as they did about those attendant benefits. Samuels reported that Keidanren chairman Ishikawa Ichirō was an avid supporter of rearmament for two reasons: 1) it would allow Japan's industrial machinery to again operate at full capacity, and 2) he "believed that Japanese industry would derive enormous technological benefits from [U.S. military assistance programs], benefits that would accelerate production and, ultimately, Japanese autonomy. He never spoke about the performance features of the arms themselves or the threats they were designed to address."[24] Industrial development and indigenization of technology were at the heart Keidanren's support for domestic defense production.

Under Ishikawa's leadership, the Defense Production Committee grew out of the Working Group on U.S.-Japan Economic Cooperation in 1952 as the primary vehicle for industry's input to defense policy, becoming such an influential force in policy decisions that it came to be called Japan's "private defense ministry." In 1953 the DPC issued a report calling for procurement of some 3,000 aircraft for the National Safety Agency, including both indigenously developed propeller aircraft and U.S. aircraft produced under

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[23]Green, *Arming Japan*, 34.

[24]Samuels, *Rich Nation*, 143

license. The plan was clearly geared toward advancing the interests of Keidanren's constituent firms by increasing their output and guaranteeing access to technology, but it was without widespread support outside the defense industry because of its cost and intense public opposition to such a large force.[25] With the creation of the JDA and the SDF in 1954, along with MSA guarantees that the U.S would subsidize defense production, the DPC saw an opportunity to get around the issue of cost by taking advantage of U.S funding.

While industry was encouraging rearmament and formulating plans for indigenization of tantalizing new technologies from the United States, government ministries were laying the legal groundwork for licensed production. MITI shared some of the DPC's enthusiasm for defense production as it was in harmony with the ministry's broader mission of creating demand, nurturing new technologies and industries, and promoting exports.[26] However, as Michael Green reported, MITI did not share the DPC's belief that military production was an end in itself. Instead, MITI viewed military aircraft in particular as an intermediate step toward the creation of a related commercial industry, "a 'peace industry' which would be acceptable to media and financial sectors and would have a large export market."[27]

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[25]Ibid., 145.

[26]Michael J. Green, *Kokusanka: FSX and Japan's Search for Autonomous Defense Production*, M.I.T. Japan Program occasional paper 90-09 (Cambridge. Mass.: M.I.T. Japan Program, Center for International Affairs, Massachusetts Institute of Technology, 1990), 13.

[27]Ibid.

In order to secure administrative supervision over the industry, MITI officials drafted the Aircraft Industry Law in 1952. This law firmly established that MITI, rather than the rival Ministry of Transportation, had jurisdiction over aircraft production and could exercise its industrial policy on aircraft production. In 1954 MITI followed up with the Weapons Production Law that established a licensing system for weapons (including aircraft) in order to "regulate the impact of weapons procurement on the nation's industrial structure."[28] MITI was positioning itself to guide aircraft production down a course that would incorporate advanced military technology from the U.S. as a means of increasing Japan's industrial competitiveness. Samuels and Whipple noted that this created a novel situation, "for it has been standard historical practice for nations to foster civilian industrial development in pursuit of military advantage, not the other way around."[29]

Japan's defense establishment, the NSA and later the JDA, did not see eye to eye with MITI and the DPC regarding defense production. Where the latter two organizations sought to indigenize production as a means of nurturing industry, the defense bureaucracy took its cues from the Finance Ministry, which was opposed to domestic defense production from the start. The MOF, and by default the NSA which was occupied by

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[28]Japan Defense Agency, *1967 Bōei Sōbi Nenkan* (Tokyo: Japan Defense Agency, 1967), 374, quoted in Green, *Kokusanka*, 15.

[29]Richard J. Samuels and Benjamin C. Whipple, "Defense Production and Industrial Development: The Case of Japanese Aircraft," in *Politics and Productivity: How Japan's Development Strategy Works*, ed. Chalmers Johnson, Laura D'Andrea Tyson, and John Zysman (Berkeley: Ballinger, 1989), 283.

former MOF officials, saw any attempt at resurrecting Japan's aircraft industry in the early 1950s as a hopeless waste of precious funds. U.S aircraft were superior to anything Japan could produce, therefore the most cost-effective way to arm Japan's defense forces would be to procure ready-made U.S. systems.[30]

Most politicians shared the view of the MOF. Prime Minister Yoshida's Liberal Party government was opposed to the DPC's calls for remilitarization and MITI's efforts at nurturing commercial industry via military production. John Dower reported that:

> Where Yoshida, viewing the situation largely from the perspective of the national budget, concluded that Japan could not afford extensive domestic rearmament, business leaders [and MITI], who thought more in terms of technological and industrial stimulation, as well as the potential export market for Japanese military products, argued that Japan could not afford *not* to move rapidly into military production.[31]

One of Yoshida's primary concerns was obtaining U.S. security guarantees that would enable Japan to pursue a course of industrial development unencumbered by the burden of military production. When it became clear that part of the U.S. Cold War strategy of containment included Japanese rearmament as well as rebuilding the civilian economy, Yoshida made concessions on weapons production in order to channel valuable resources into industrial development. When the MSA was concluded in 1954, Yoshida's government obtained written assurance that U.S. funds and technology could be used for civilian purposes as well as for weapons production. Yoshida "recognized

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[30]Green, *Arming Japan*, 37.

[31]Dower, 446-447, quoted in Green, *Arming Japan*, 37.

that the United States was making available advanced technology–something even more important [than weapons] to national security as the Japanese understood it."[32]

Cases of Licensed Production

While there was disagreement in Japan over the scale and cost of arming the Self Defense Forces, the U.S. helped to mediate the dispute with the Mutual Security Assistance Agreement. MITI and the DPC easily overcame MOF concerns about financing arms production by allying themselves with U.S. Cold War policy, which included ample funding for weapons. With assurances that technology transferred under the MSA could be used in developing the civilian economy, the agreement also placated politicians. The first cases of licensed aircraft production thus represented a broad consensus of institutional and alliance interests, a consensus that would erode somewhat as the U.S. came to feel threatened by Japan's rising technological and economic power.

First Steps: The F-86 and T-33

Japan and the U.S. concluded the first agreement for licensed aircraft production in June 1955. The U.S. Department of Defense actually requested the agreement, as the end of the Korean War meant downsizing for the U.S. military and licensed production in Japan of U.S. aircraft made financial sense. Of course, off-the-shelf purchase of aircraft produced in the U.S. and exported to Japan would have done more to keep American

[32]Samuels, *Rich Nation*, 150.

production lines open and increase economies of scale, but the U.S. shared the goal of creating a stable industrial base in Japan as part of the MSA. MITI and the DPC welcomed the request from United States as the first major step in the formation of an important new industry.

The 1955 agreement established that Mitsubishi Heavy Industries (MHI) would produce 300 F-86 fighter jets under license from North American Aerospace Corporation (the Japanese version designated F-86F) and Kawasaki Heavy Industries (KHI) would produce 210 T-33A jet trainers for F-86 pilots under license from Lockheed. Lockheed initially preferred that MHI be given the T-33 contract, citing the fact that while no Japanese aircraft manufacturing firms seemed to possess the necessary resources to produce jet aircraft, MHI appeared to be the best among a number of poor choices. The fact that KHI ended up with the contract despite Lockheed's preference is evidence of MITI's effort to diffuse aircraft manufacturing technology among different firms. KHI was selected because MHI had already been given the F-86 license, and MITI wanted multiple firms to benefit from the experience of high-tech military aircraft production so as to help the industry as a whole.[33]

The U.S. offered to bear 52 percent of the production costs for the two programs and allow Japan to produce 60 percent of the component parts for the aircraft domestically.[34] In the end, the U.S. ended up bearing 67 percent of the total program

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[33] Hall and Johnson, *Aircraft Co-Production and Procurement Strategy,* 75-76.

[34]Green, *Arming Japan,* 40.

costs.[35] Table 3 shows the gradual indigenization of the F-86 and T-33 programs as well as a comparison of U.S. and Japanese production funds for the two projects. Note that funds contributed by the two governments represent actual production costs and do not reflect additional program costs including tooling and development.[36]

Table 3. Indigenization of the F-86F and T-33A Projects

	1956	1957	1958	Total
F-86F (MHI)				
Units	70	110	120	300
Japanese funds (billion yen)	2.3	8.7	11.6	22.6
U.S. funds (billion yen)	9.0	7.3	3.0	19.3
Domestic content (%)	0	32.4	48.0	—
T-33A (KHI)				
Units	97	83	30	210
Japanese funds (billion yen)	2.7	3.8	1.5	8.0
U.S. funds (billion yen)	3.6	2.5	0.6	6.7
Domestic content (%)	16	35.2	43.1	—

Source: Adachi Tetsuo, "*Ririkuki wo Mukaeta Nihon no Kōkūki Sangyō*" (The Japanese Aircraft Industry Welcomes the Takeoff Period), *Chōsa Geppō*, no. 185 (Tokyo: Nihon Chōki Shinyō Ginkō, 1981): 13. Reprinted in Samuels, *Rich Nation*, 210.

MHI and KHI were given time to work up to full-scale domestic assembly and as they did so domestic content in both the F-86 and the T-33 steadily increased, as the table shows. The first 20 T-33 aircraft in the program were actually manufactured completely in California and then shipped to Japan as knock-down assemblies, with the following 10

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[35]Drifte, 51.

[36]For details about the additional costs associated with licensed production as well as a discussion of investment in tooling and facilities, see Hall and Johnson, *Aircraft Co-Production and Procurement Strategy.*

aircraft shipped as component parts and the remaining 180 produced in Japan. In the case of the F-86, 10 aircraft were shipped as knock-down kits, 60 as component parts, and the remaining 230 were produced in Japan. The average value of North American Aerospace components in the F-86 decreased from approximately $97,000 per aircraft in the second (component shipment) phase to under $34,000 per aircraft during the final phase of production in Japan.[37]

The indigenization of aircraft production was rapid, with widespread benefits to Japanese industry. Initial production of the F-86 and T-33 led quickly to other licenses, one in 1957 for KHI to produce 42 Lockheed P2V-7 antisubmarine warfare planes. In total, Japanese aircraft manufacturers went from being out of touch with their craft and producing no planes in the mid-1950s to successfully constructing 552 high-tech aircraft by the early 1960s. As Hall and Johnson concluded, the benefits derived by industry went beyond a handful of new airplanes:

> The results of these programs were far greater than the mere provision of a total of 552 planes for the Japanese military forces. After all, planes could have been purchased from [North American Aerospace] and [Lockheed] assembly lines. The major achievement of the co-production programs was the acquisition of a modern aerospace manufacturing capability . . . As a result of the skillful importation of U.S. aerospace technology from 1954 to 1961, the Japanese have acquired an advanced aerospace manufacturing ability.[38]

As early as 1956 Japanese industry and defense planners felt that aircraft manufacturing capability was good enough for Japan to produce its own indigenous jet

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[37]Hall and Johnson, *Aircraft Co-Production and Procurement Strategy,* 90-91.

[38]Ibid., 101.

aircraft without licensing a design from the United States. Many in the industry complained that while licensed production yielded enormous benefits to Japan in the form of access to technology, it would force aircraft production to remain a second-class operation dependent on foreign designs since it prevented designers from gaining experience. The arguments proved persuasive, and in 1956 Fuji was awarded a contract to produce Japan's first indigenous jet aircraft, the T-1 trainer. At the same time, a contract went to a consortium of companies led by Ishikawajima Heavy Industries (IHI) to design and produce engines for the new trainer. The J-3 engine, as it was called, proved to be a difficult project for the fledgling industry and it took considerably longer to design than engineers expected. Fuji ended up installing the engine in only the last 20 of 60 T-1 trainers in 1960, with engines for the other 40 planes imported off the shelf from the U.K.[39]

The JDA reported that development of the T-1 trainer and the J-3 engine resulted in tremendous benefits for the aircraft industry at large because of technology diffusion, including a new fuel control system with multiple applications, high-speed high-temperature hardware, and others. At the same time, JDA planners were also convinced that unexpected delays and cost overruns in the design phase of the engine proved that the aircraft industry needed more experience with functional foreign designs before going it alone. Technology imported with foreign models was, after all, just as easy to diffuse as technology developed the hard way, by Japan's own designers. The J-3 convinced the

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[39]Samuels, *Rich Nation*, 206-207.

JDA that, at least for the time being, "licensed production was preferable to domestic development."[40]

Fighter-Interceptors: The F-104, F-4, and F-15

In the following years Japan continued to secure licenses to produce U.S. aircraft for the ASDF while it indigenized and diffused new aerospace technology. New fighter aircraft, which have traditionally represented the cutting edge of aerospace technology, were licensed about every ten years. The F-104J was selected as the follow-on for the F-86 in 1960, followed by the F-4EJ in 1969 and the F-15J in 1978. Increasing levels of domestic production were accompanied by decreasing amounts of U.S. government funding. The final U.S. subsidy for aircraft production was paid in 1962 as part of the F-104J program. Table 4 summarizes U.S. and Japanese contributions in the early 1960s.

Table 4: Financial support for the F-104J program, Japanese fiscal years 1960-1964 (in $ million)

Year	U.S.	Japan	Yearly Total	Cumulative Total
1960	25.0	0	25.0	25.0
1961	25.0	16.0	41.0	66.0
1962	25.0	47.4	72.4	138.4
1963	0	61.0	61.0	199.5
1964	0	69.4	69.4	268.9
Total	75.0	193.9	268.9	

Note: detail may not add to total due to rounding.
Source: Hall and Johnson, *Aircraft Co-Production and Procurement Strategy*, p. 106.

[40]Ibid., 208.

The process by which Japan selected the F-104 for licensed production reveals how military concerns are subordinated to technological and industrial concerns in Japan's security policy planning. Discussion of a replacement aircraft for the F-86 had begun in 1956 when the ASDF started reviewing potential candidates. Industry was anxious to find a replacement as quickly as possible, as Mitsubishi and Kawasaki faced costly gaps in production if a successor aircraft was not available to replace the F-86 and T-33 projects when they ended in 1960.[41] After fact-finding missions to the United States in 1957 and 1958, the JDA and the ASDF concluded that the Grumman Aerospace F-11 was the most suitable choice for Japan's next generation fighter aircraft. They made their recommendation to the National Defense Council (the forerunner of today's National Security Council, a cabinet-level group headed by the Prime Minister that reviews JDA policies) in 1958, only to have it overruled in favor of the F-104.

Michael Green has correctly pointed out that had the recommendation of the JDA and the ASDF been followed, it would have established a pattern of military professionals exercising authority in the procurement process.[42] The ASDF wanted the F-11 because they deemed it the safest and easiest-to-maintain aircraft for Japan's defense needs, military utility being their primary criterion for aircraft selection. The fact that the National Defense Council overruled the ASDF's recommendation indicates that something other than military utility was driving the procurement process. There is some

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[41]Samuels, *Rich Nation*, 215.

[42]Green, *Arming Japan*, 41.

speculation that the decision was driven by illegal financial incentives from the Lockheed Corporation, bribes paid to Prime Minister Kishi Nobusuke and Finance Minister Satō Eisaku. Indeed, Lockheed was responsible for later payoffs involving the commercial L-1011 transport aircraft to Prime Minister Tanaka Kakuei, but it is likely that bribes were not the only reason for overriding the ASDF's decision to procure the F-11.

In 1959 the DPC articulated another reason for ignoring the military needs of the ASDF. "Through the indigenization [of the F-104] we must not merely consider raising the technological level of the aircraft industry, but we must consider how to advance fully our contribution to raising the technological level of industry in general."[43] The F-104 program significantly raised the competence of Japanese manufacturers in new process technologies and a wide variety of subsystem-related technologies, including electronic components that were used for the aircraft's avionics.[44]

With so much to gain from F-104 production, the DPC continued to urge the government to procure the aircraft in the face of outright resistance from the ASDF. The initial production run of the F-104 was scheduled to end in January of 1965, but the DPC issued a policy statement in 1963 advocating procurement of 100 additional aircraft to keep Mitsubishi production lines open. The ASDF argued that it would have to create more fighter squadrons for that many airplanes, squadrons that it did not need to provide

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[43]Nihon Kōkū Uchū Kōgyōkai, *Nihon no Kōkūki Uchū Kōgyō Sengo Shi* (Japan's Aerospace Industry: A Postwar History) (Tokyo: Nihon Kōkū Uchū Kōgyōkai, 1987), 59, quoted in Samuels, *Rich Nation*, 216.

[44]See Hall and Johnson, *Transfers of United States Aerospace Technology,* chap. IV.

for Japan's defense. The DPC ignored the ASDF's argument, in effect concluding that the technological benefits of aircraft production, rather than military necessity or performance criteria, were the most important considerations in procurement policy (although compromise with the MOF eventually led to production of just 30 new aircraft).[45] The DPC's position was a blatant slap in the face for the role military professionals in the procurement process.

Licensed aircraft production was paying big dividends for industry and Japan's technology-centered security strategy as the F-104 program concluded. Domestic content of advanced fighters had increased from around 60% in the F-86 and T-33 to 85% in the F-104J and 90% in the F-4EJ that followed the F-104. In fact, with the exception of its top-of-the-line fighter aircraft and the P-3C antisubmarine warfare plane, all ASDF aircraft procured from 1964 to the mid-1980s were developed and produced exclusively in Japan. This included the T-2 supersonic jet trainer, the FST-2 and F-1 fighter jets (both based on the T-2), as well as transport and utility aircraft. Table 5 summarizes all of Japan's major military aircraft projects through the early 1980s.

Licensed production continued with the F-15J program beginning in 1978. Selection of the aircraft was based upon the need to outfit the ASDF with a modern interceptor that would replace aging F-86s, F-104s, and F-4s. As a 1976 JDA white paper noted, the rapid advance of military aviation technology throughout the world necessitated a highly maneuverable interceptor capable of operating at both high and low

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[45]Green, *Arming Japan*, 49.

Table 5: Japan's Major Military Aircraft Development Programs

Aircraft	Contractor	Year Ordered/ # of Aircraft	Funding/Production
T-33A Jet Trainer	KHI (Licensed from Lockheed)	1955 / 210	67% U.S. Funding 60% Domestic Production
F-86F Fighter Jet	MHI (Licensed from North American Aerospace)	1955 / 300	67% U.S. Funding 60% Domestic Production
T-1 Trainer Jet	Fuji	1956 / 60	100% Domestic Production
P2V-7 Antisubmarine Warfare Plane	KHI (Licensed from Lockheed)	1958	52% U.S. Funding 50% Domestic Production
F-104J / F-104DJ Fighter Jet	MHI (Licensed from Lockheed)	1960 / 230	27% U.S. Funding 85% Domestic Production
YS-11 Turboprop	Consortium (Japan's First and Only Attempt at a Commercial Transport)	1964 / 182	50% Japanese Gov. Funding 23 Ordered by JDA
MU-2 Small Turboprop	MHI	1964 / 44	100% Domestic Production
F-4EJ Fighter Jet	MHI	1969 / 140	90% Domestic Production
C-1 Military Transport	KHI	1970 / 31	100% Domestic Production
T-2 Jet Trainer	MHI	1970 / 94	100% Domestic Production
FST-2 Fighter Jet	MHI (Based on the T-2)	1971 / 68	100% Domestic Production
F-1 Fighter Jet	MHI (Based on the T-2)	1977 / 77	100% Domestic Production
P-3C Antisubmarine Warfare Plane	KHI (Licensed from Lockheed)	1978 / 75	Produced Under License, but nearly 100% Domestically*
F-15J Fighter Jet	MHI (Licensed from McDonnell Douglas)	1981 / 155	70% Domestic Production
T-4 Jet Trainer	Consortium	1984 / 93	100% Domestic Production

*See Samuels, *Rich Nation, Strong Army,* 228.
Source: Green, *Arming Japan*, 32-33.

altitudes to counter emerging threats.[46] The F-104, while fast, did not have very good maneuverability. The F-4 was considered to be on par with Soviet aircraft in the 1970s, though it was based on 1960s technology. The F-86 was considered long-since obsolete by the mid-1970s and was scheduled for complete retirement by 1980.

A number of options existed that would have met the ASDF's demand for new interceptors including off-the-shelf purchase or licensed production of a new U.S. fighter or increased production of the F-4EJ. According to one analysis, the F-4 option would have been the most economical choice since the aircraft was already being produced in Japan by MHI and it was not technologically deficient in terms of likely military threats. Increased production runs would have contributed to economies of scale, reducing unit costs and making it possible for the JDA to procure larger numbers of aircraft to partially offset any foreign technological advances with numbers.[47] The JDA rejected that option however, claiming that "the F-4EJ [was] no longer a peer of enemy fighters."[48] On December 6, 1976 it announced its intention to license produce the F-15 in Japan, giving priority to capability over cost and quantity in its decision:

> Quality versus quantity is nowhere a more decisive factor than in combat aircraft. Inferior weaponry for ground forces can be offset to a certain degree by, for example, superior utilization of terrain, or even more simply by overwhelming numerical superiority. Qualitative differences are far more telling in air defense operations, however; fighters without all-weather capability are no match for

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[46]Japan Defense Agency, *Defense of Japan 1976* (Tokyo: Japan Times Co., Ltd, 1976), 107-108.

[47]Chinworth, 103.

[48]Japan Defense Agency, 1976, 108.

> aircraft with such equipment at night or in clouds, and even a numerically superior force of fighters cannot deal effectively with enemy aircraft enjoying superior electronic warfare capability.[49]

Chinworth noted that defense analysts have attacked the rationale of this entire analysis, but the JDA was determined to procure the latest technology available. Just procuring the F-15 was not enough, however. Japan had to produce the aircraft, even though all indications were that it could be purchased off the shelf for far less money. The GAO reported in 1982 that limited production runs and licensing fees to McDonnell Douglas would combine to make licensed production by MHI (by now the default prime contractor for fighters) "much more inefficient than the purchase of finished items."[50] The JDA never seriously entertained this option though, leading the U.S. State Department to conclude that "if the United States had not agreed to coproduction of the F-15, Japan would have chosen to coproduce another less-capable aircraft from another source."[51] Apparently fighter capability was not the most important consideration as the JDA had claimed, but access to technology was paramount. The decision was also

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[49]Japan Defense Agency, *Defense of Japan 1977* (Tokyo: Japan Times Co., Ltd., 1977), 87, quoted in Chinworth, 105.

[50]U.S. General Accounting Office, *U.S. Military Coproduction Programs Assist Japan in Developing its Civil Aircraft Industry*, Report to the Chairman, Subcommittee on Trade, Committee on Ways and Means, House of Representatives (Washington, D.C.: U.S. Government Printing Office, March 1982), 5.

[51]U.S. General Accounting Office, *U.S. Military Aircraft Coproduction With Japan*, Statement of Joseph E. Kelley, Director, Security and International Relations Issues before the House Subcommittee on Commerce, Consumer Protection, and Competitiveness (Washington, D.C.: U.S. Government Printing Office, February 23, 1989), 5.

characterized by the influence of MITI industrial policy, which a GAO investigation identified in 1989:

> MITI played an important role in the F-15 and other coproduction programs. [It] set policy for both military and civil aircraft production in Japan. JDA selected and decided to purchase aircraft according to mission requirements. MITI then evaluated the impact of decisions to purchase foreign aircraft on the domestic industry. While JDA ultimately decided whether to import or to coproduce foreign military aircraft, MITI's guidance and recommendations influenced such decisions. MITI had personnel assigned to JDA's Equipment Bureau and made recommendations to the JDA on contract awards for military aircraft programs. We found that MITI had influenced the JDA's decisions on U.S. aircraft coproduction.[52]

The U.S. position on the F-15 program was clearly different from its position on previous licensed production agreements with Japan. Whereas the Japanese aerospace industry had received encouragement and even funding from Washington to build its domestic technological base in earlier programs, the U.S. started to express concern over the rising competitiveness of the industry in the late 1970s. This was undoubtedly due to the shifting balance of trade, which was increasingly in Japan's favor, and the level of sophistication Japanese aerospace companies had achieved by incorporating U.S. technology.

When the two governments concluded an MOU for the transfer of F-15 technology in 1978, it was dramatically different from previous agreements. Of course there was to be no U.S. funding; Japan was economically capable of paying for the aircraft by itself. The technology being transferred was also considered far more sophisticated than anything that had been transferred before: the F-15 represented the

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[52]Ibid., 7.

cutting edge of U.S. aerospace manufacturing, not a hand-me-down to ASDF. As such, the MOU contained a long list of F-15 technologies that would not be transferred as part of the program. Instead, they would be "black boxed," meaning that certain technologically sensitive components would literally be produced in the U.S., sealed in black boxes, and shipped to Japan for installation in the aircraft. Japanese manufacturers and the ASDF were forbidden from opening the boxes. The idea was to prevent reverse engineering of American industrial secrets by Japanese firms by requiring Japan to ship the sealed components back to the U.S. when they needed servicing. After the program began, U.S. defense officials met with JDA officials every year to go over the list and determine if there were any items that could be released.[53]

The black boxes infuriated the JDA and the ASDF, which claimed that they hindered maintenance operations and increased inventory costs by requiring large stores of additional parts to be on hand locally since local repair was impossible. They also angered Japanese manufacturers, who were anxious to try their hands at integrating high-tech products of their own into the F-15. Over time, pressure from both groups resulted in the release of key technologies and even the supplanting of some U.S.-made components by Japanese products including a new mission computer and a ring laser gyro inertial navigation unit.[54]

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[53]Ibid., 6-7.

[54]Chinworth, 119-123.

Japan paid a price in terms of domestic content in the F-15 program. Whereas the amount of aircraft component parts produced by Japanese manufacturers had risen to around 90 percent with licensed production of the F-4, the percentage dropped to below 70 with the F-15.[55] By persistently demanding that the U.S. release black-boxed technologies, however, Japan did increased the amount of domestic content by the end of the program.

In the end, Japan produced some 186 F-15 aircraft and steadily gained access to new technologies despite U.S. objections and efforts to the contrary. Licensed production of the F-15, like the fighters that preceded it, proved to be a major step toward enabling the Japanese aerospace industry to attempt an indigenous fighter design for its next procurement program, the FSX. Many of the technologies that domestic manufacturers designed to supplant black boxes formed the technological foundation for the domestic FSX proposal. In that regard, the F-15 helped to advance Japan's security strategy whether or not it was the most economical option or the best way for Japan to counter the existing military threat. It was a vehicle for technology acquisition that helped to secure the competitiveness of domestic manufacturers, a mission that was in perfect harmony with a technonationalist view of security.

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[55]Green, *Arming Japan*, 83.

CHAPTER 3
INDIGENOUS DEVELOPMENT AND THE FSX

In the previous chapter I outlined a number of cases of licensed aircraft production spanning four decades of Japan's post-war history. I showed that the decision to license produce certain aircraft had more to do with technological development than the actual needs of the ASDF. In this chapter, I consider indigenous development of Japanese aircraft and their role in the country's national security strategy. In the first section, I examine Japan's efforts to move from licensed production of U.S. systems to development of its own indigenous fighter aircraft. In the second section I present the case of the FSX fighter, a project that Japanese planners conceived as the crown jewel of indigenous post-war aircraft development but which came to symbolize the pervasive influence of the United States in Japan's security planning. I conclude that the FSX demonstrates Japan's continued emphasis on establishment of a domestic technology base over other concerns in military procurement, and that alliance relations with the United States are not always conducive to Japan's technonationalist security strategy.

The Drive Towards Indigenization

While licensed production helped to establish the competence of Japan's aircraft industry, it was never supposed to be an end in itself. MITI saw licenses as a step toward an independent commercial aircraft industry, while the DPC saw them as cheap (often free) access to technology on the road to autonomous military production. While the move from licensed production to autonomous production, or *kokusanka*, has been

opposed at various junctures and in varying degrees by politicians, MOFA, MOF, the JDA, and the ASDF, there has always been a general understanding that licensed production would not continue indefinitely. Licensed production was part of the "transition from Japan as a dependant of the United States to a more active partner in the security relationship."[1]

Production vs. Development

One of the problems that accompanied licensed production was that it robbed Japanese engineers and aircraft designers of critical experience in the process of producing aircraft. It was one thing to assemble a knock-down kit imported from the United States; this first stage of licensed production was akin to putting together a three-dimensional jigsaw puzzle. The next stage, domestic production of aircraft subsystems, introduced important new technologies and management practices. The subassembly for wheel brakes on the F-104, for example, became the basis of Japan's bullet train braking system.[2] These advances were no doubt significant, especially for an industry that had been inactive for seven critical years after World War II. To develop a world-class industry, however, Japanese aircraft manufacturers had to move beyond putting together kits and copying manufacturing techniques for aircraft subsystems. They had to learn the

[1]Chinworth, 98.

[2]Green, *Arming Japan*, 14.

know-why of modern aircraft as well as the know-how; in other words, they had to learn to develop as well as produce.

Development of modern jet aircraft, especially fighter aircraft, is an incredibly complex process that requires much more experience and skill than simply pushing aircraft through an assembly line. Particularly difficult is the integration of subsystems where all of the parts of a new aircraft must be made to fit and work together. Samuels and Whipple described the difficulties in the process as follows:

> Subsystems cannot easily be integrated at the tail end if the interface was not properly specified up front or if inevitable in-process design changes have not been properly managed. Integration problems are magnified by concurrent development and production, multiple organizational boundaries, sheer complexity, and the need to insulate the overall program from delays and difficulties at the subsystem level. With its blend of stiff technical and managerial requirements, systems integration is the most challenging aspect of aerospace production, and given the infrequency of full-scale production programs, also the hardest set of skills to develop.[3]

With licensed designs, Japanese aircraft manufacturers were removed from the entire integration process. The F-86, F-104, F-4, and F-15 all came to Japan with design-phase subsystem integration long since complete, preventing engineers from learning this critical step in aircraft development. Planners, particularly those in the DPC and the JDA, were aware of this shortcoming early in the history of licensed production. Accordingly, the JDA created the Technology Research and Development Institute

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[3]Samuels and Whipple, 287.

(TRDI) in 1958 to concentrate on the "development of new systems and not just experimentation with old U.S. technologies."[4]

Incorporation of an increasingly sophisticated array of commercial technologies into aircraft development became a priority for TRDI as Japan began to emerge as a world leader in industries like chemicals and electronics. Industry officials came to realize that defense technology offered opportunities for growth not only in terms of technological spin-offs, but also from "spinning on" civilian technologies to military systems. This was one road to autonomous development, which was a higher goal than the domestic production of weapons made possible by licensing.[5] Table 6 summarizes the stages of autonomous weapons development through which Japan was passing.

Table 6: Climbing the Indigenization Ladder

Stage	Activity
1	Servicing and repair of imported weapons systems.
2	Overhaul of imported weapons systems
3	Local assembly of imported subassemblies (knock-down kits)
4	Limited licensed production; assembly with some locally-made components; locally-made components sold to licensor.
5	Some independent licensed production, but important components are imported.
6	Local licensed production of less-advanced arms; R&D on improvements and derivatives.
7	Local licensed production for most weapons; limited R&D for advanced arms; R&D and production for less advanced arms.
8	Complete independence in R&D and production.

Source: United Nations Institute for Disarmament Research, 1988, reprinted in Green, *Arming Japan*, p. 14.

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[4]Green, *Arming Japan,* 47. Green noted that TRDI had been the NSA Technology Research Institute from 1952 to 1954 and the JDA Technology Research Institute from 1954 to 1958. The addition of the word "Development" to the organization's title signified its new, expanded role.

[5]Green, *Arming Japan*, 15.

Native Japanese Aircraft

While the DPC and the JDA pinned their hopes for improving domestic research and development on military production and TRDI in the late 1950s, MITI was already preparing to make the jump from licensed military production to indigenous development of civilian aircraft. In 1958 MITI drafted (and the Diet passed) the Aircraft Industry Promotion Law, a piece of legislation that explicitly established *kokusanka* as the objective of Japan's aircraft industrial policy and linked commercial development with military production.[6] The law included funding for development of Japan's first indigenous post-war transport, the YS-11 turboprop. MITI saw the YS-11, which it intended to develop as a commercial export as well as for the ASDF, as the key to catching up with and surpassing the aircraft industries of other industrial nations.[7]

The YS-11 was a technical success, with a consortium of companies including MHI, KHI, and Fuji eventually producing 182 aircraft and gaining invaluable integration experience in the process. It was a financial disaster, however, with cost overruns and delays amounting to a $36 million loss by the end of the program in 1970.[8] Japanese firms have never attempted to develop another major commercial transport since the YS-11, leaving MITI's strategy for aircraft industrial development inextricably tied to military production and TRDI for nurturance of new skills and technologies.

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[6] Ibid., 48.

[7] Samuels, *Rich Nation*, 211.

[8] Ibid., 213.

For the DPC, development of military aircraft as a means of nurturing industry was far more promising than commercial projects. Demand for military aircraft was constant and relatively stable following the creation of the ASDF, and fighters offered performance and technology gains that far exceeded commercial transports.[9] Accordingly, the DPC began advocating indigenous military jets soon after licensed production began.

From 1964 to 1966 the DPC submitted statements to the LDP and the JDA that contained three policy goals: development of an indigenous supersonic jet, an increase in defense R&D spending, and a rolling-budget system for weapons development and production.[10] With the end of U.S. subsidies under the MSA in the mid-1960s, the JDA had some freedom to adopt the DPC's suggestions and it incorporated them in part into its third Defense Build-Up Plan in 1967.[11] One of the measures the JDA adopted was to proceed with domestic development of a supersonic jet trainer, the T-2. Green noted that "The element of industrial policy [in the T-2 decision] was undeniable. Nations which develop supersonic jet fighters then produce modified versions of the same jet [*sic*] as

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[9]Samuels and Whipple, 56-57.

[10]Green, *Kokuksanka*, 21.

[11]Defense Build-Up Plans were initiated with the F-86 agreement as a means of projecting future procurement and force-structure needs of the Self Defense Forces. They were utilized until 1976 when National Defense Program Outlines (NDPO), supplemented by mid-term Defense Program Estimates, became the norm. When the cabinet approved the first NDPO in 1976, it simultaneously established the famous "one-percent rule" that formally limited defense spending to one percent of the country's GNP. During the Nakasone administration in the 1980s it became impossible to meet the needs of the NDPO within the one-percent limit, and it has been exceeded numerous times since.

trainers. Japan was doing the opposite–developing a supersonic jet as a trainer first, in order to later build a jet fighter based on its trainer design."[12]

Indeed the T-2, funding for which was approved under the fourth Defense Build-Up Plan put forth by JDA Chairman Nakasone Yasuhiro in 1971, showed the same signs of subordinating military needs to industrial concerns that had surfaced with the F-104. The T-2 project "was less about military roles and missions than about the industry's intense desire to design and manufacture its own supersonic jet."[13] Since trainer versions of both the F-86 and F-104 were already in service and other existing designs offered more functionality, ASDF officers and MITI officials called the T-2 "a trainer for industry, not pilots."[14] The former group likely uttered the remark with disdain, while the latter probably saw no problems with the arrangement. ASDF officers had initially supported license-producing the Northrop T-38 trainer (a derivative of the F-5 fighter) from the United States. Samuels argued that "Had the T-2 been intended to meet the needs of the ASDF, rather than to provide systems integration experience, the JDA would likely have selected [any of a number of aircraft available at the time], such as the Northrop T-38", which had strong support among some *naikyoku* of the JDA as well.[15]

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[12]Green, *Kokusanka,* 22.

[13]Samuels, *Rich Nation,* 224.

[14]Green, *Arming Japan*, 50.

[15]Samuels, *Rich Nation*, 224.

It is interesting to note that MITI gave its support to the T-2 and the subsequent FST-2 and F-1 projects while withholding its support for domestic development of two concurrent proposals, the PXL maritime patrol (antisubmarine) aircraft and an airborne early warning (AEW) aircraft. Both proposals originated in Nakasone's fourth Defense Build-Up Plan, but both failed to find funding approval. MITI's Trade Bureau opposed the aircraft on the grounds that increasing U.S. pressure to reduce Japan's trade surplus could be offset by importing the Lockheed P3-C antisubmarine aircraft (an argument characteristic of the Trade Bureau and MOFA in the later FSX debate). The interesting aspect of MITI's position is that the PXL and AEW would have contributed directly to the Ministry's strategy of developing commercial transport capabilities: both planes were large, slow, multiengine aircraft.[16] Though there were divisions within the Ministry, it appears that after the failure of the YS-11 MITI determined *kokusanka* of military aircraft was more important than developing a commercial aircraft industry. The T-2 was the next step toward indigenous fighter development.

The T-2 went a long way toward reducing Japan's deficiency in development and integration experience, and in fact it established Japan as only the sixth nation to ever produce a supersonic aircraft.[17] It also resulted in tremendous technology diffusion, including "measurement systems for control panels used in liquefied natural gas tankers,

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[16]Mark Lorell, *Troubled Partnership: A History of U.S.-Japan Collaboration on the FSX Fighter* (New Brunswick: Transaction, 1996), 56-61.

[17]Samuels, *Rich Nation*, 225. Japan followed the United States, the Soviet Union, Britain, France, and Sweden.

broadcast electronics, a canopy fabrication process that was adopted for automobile manufacture, magnesium alloys used in automobile components, and titanium alloys applied to rockets and power plants."[18] The project's real value became clear later in the 1970s, however, with government approval for the FST-2 and F-1 fighter aircraft (they are essentially the same aircraft, but represent different stages of development).

Like the T-2 on which it was based, the F-1 was developed and produced by MHI in Japan. It marked Japan's entry into the elite group of nations that produce their own fighter jets. As Mark Lorell observed, it also "established an important psychological and political precedent of Japan developing its own high-performance supersonic fighter aircraft."[19] It demonstrated that Japan could move beyond trainers and transports into the high-technology realm of fighter integration.

The F-1 was not an unqualified success, however. When the first production model flew in 1977, it was already obsolete compared to the F-4 that Japan had been license-producing since 1969. The F-1 was too small to carry a significant amount of ordinance, slow, awkward to fly, and lacked adequate air-to-air combat capability.[20] When loaded, the plane failed to meet any credible military purpose.[21]

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[18] Samuels, *Rich Nation*, 225.

[19]Lorell, 61.

[20]Chinworth, 101.

[21]Samuels, 228.

But expecting the F-1 to meet a military purpose was asking more of the aircraft than its designers intended. Chinworth summarized the contribution of the F-1 to Japan's defense as follows:

> [The F-1] demonstrated that domestic companies could design and build something that could get off a runway. Furthermore, it illustrated the predominant role of military aircraft in the entire domestic industry, a pattern consistent with other countries more experienced. A combination of ambitions to develop indigenous aircraft, the importance of military planes to the overall industry, [and] generous technology transfers from the United States through earlier programs . . . led Japanese government and industry to press for an all-Japanese aircraft, all too often in the absence of military considerations.[22]

Japan continued to develop indigenous military aircraft with the T-4 trainer program in 1984, but the F-1 remained the country's only attempt at domestic fighter development until the FSX controversy. Despite all of the efforts at developing a technology base sufficient to support an indigenous military aerospace industry, most aircraft and all cutting-edge fighters continued to be licensed into the 1980s. One analyst's estimate of Japanese-developed systems in use by the ASDF in 1990 broke the inventory down like this: 21 percent of combat aircraft, 33 percent of transport aircraft, and 49 percent of trainer aircraft were indigenous designs.[23] The rest were produced under license or imported.

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[22]Chinworth, 101-102.

[23]Arthur J. Alexander, *Of Tanks and Toyotas: An Assessment of Japan's Defense Industry,* N-3542-AF (Rand: Santa Monica, 1993), 61, cited in Lorell, 53.

The FSX

As soon as the Japanese government decided to develop the F-1 domestically, planners began setting their sights on its successor. As early as 1967, when the F-1 was still on the drawing boards, MHI and TRDI informally agreed that a "real" indigenous fighter should replace it.[24] The JDA Air Staff (the air arm of the JSC) and TRDI lent their official support to the movement to replace the F-1 with an indigenous fighter in 1975, after the chief of the Air Staff's technology division reported that failure to do so would devastate Japan's aerospace technology base.[25] Industry (MHI) formed a project team in 1979 to utilize previous fighter technology in the development of the new aircraft, and MITI, with strong support from its Aircraft and Ordinance Division, formally endorsed the project in 1982. Japan was now ready to go beyond second-rate fighter production and begin development of a next-generation military aircraft.

Military Requirements of a New Support Fighter

According to its developers, the new fighter was conceived to fill a unique role in Japan's defense. The plane's name is indicative of its mission: it was dubbed "FSX," meaning fighter support experimental, a moniker that was dropped when the plane

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[24]Green, *Arming Japan*, pp. 87-88. The term "real fighter" comes from Ōtsuki Shinji and Honda Masaharu, *Nichibei FSX Sensō* (The Japan-U.S. FSX War) (Tokyo: Ronsōsha, 1991). The authors referred repeatedly to a *honkakuteki na sentōki*, a real fighter to replace the second-rate F-1.

[25]Ōtsuki and Honda, 6.

entered actual production in the late 1990s as the F-2. Support fighters technically do not exist anywhere outside of Japan. The designation is a euphemistic expression used by the ASDF in place of more traditional aircraft classifications like "attack fighter," "tactical fighter," or "fighter-bomber," all of which are in service with other air forces around the world. Since the ASDF is technically not an air force, it employs support fighters that are supposed to sound less threatening to critics of Japanese remilitarization.[26] Functionally, support fighters fill the same role as attack fighters.

An attack fighter's primary mission is to destroy targets on the ground. While most are designed with some level of air-to-air combat capability, they are really for use in suppression of enemy air defenses, anti-vehicle and anti-ship missions, and close air support of ground troops. As such, attack fighters require the capability to maneuver at very low altitudes and high speeds. They also typically have shorter operational radii than fighter-interceptors designed for aerial combat.

In 1978 Japan selected the F-15 to fill its need for a high-end fighter-interceptor (a designation the ASDF shares with other air forces), narrowing the future of domestic development to support fighters. Ōtsuki and Honda wrote that with the decision to license produce the F-15, supporters of indigenous fighter development established an informal policy of leaving interceptor design to the U.S. and focusing Japan's resources on developing a new ground-attack aircraft within ten years. There were four primary reasons for doing so: 1) Heavy interceptors like the F-14 and F-15 cost far more to

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[26]Chinworth, 133.

develop than light attack fighters (about $4 billion), so importing the former meant increased relative gains; 2) with no modern experience in aerial combat, the ASDF did not really know what kind of capabilities to incorporate into a new interceptor design; 3) Japanese technology was sufficiently advanced to preclude the need to rely on U.S. fire-control software and other components of a ground-attack or anti-ship system; and 4) since a new support fighter would succeed the domestic F-1, it would be relatively easy to garner public support for a domestic FSX.[27]

One barrier to this informal policy was the ASDF's own replacement schedule for existing fighters. In 1980, ASDF and JDA plans called for a 1985 force structure of ten interceptor squadrons (four made up of F-15s and six made up of F-4s) and three squadrons of F-1 support fighters.[28] The F-4s would be old and incapable of countering the rising threat of the Soviet Far East Air Force by that time, with the Soviets flying more sophisticated MiG-29s and Sukhoi Su-27s. The F-1s, though they had been deployed only since 1977, were already seen as obsolete. Accordingly, in 1980 the ASDF began formal studies of possible replacements for both the F-4 and the F-1 soon after 1985. A formal decision was not expected until 1984, meaning that it would be impossible to develop and deploy a new domestic fighter in time to meet the replacement

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[27]Ibid., 8-9.

[28]Lorell, 65.

needs of the ASDF. Only direct purchase of a foreign aircraft or another licensed design could meet the schedule.[29]

There were other problems as well. MITI's Trade Bureau and MOFA were both growing increasingly wary of plans to produce a domestic fighter because of the possibility of a negative reaction in the United States.[30] The aerospace industry was one sector where the United States always ran a trade surplus with Japan, and in days of increasing trade friction importing or licensing aircraft could be used to alleviate some of the tension associated with Japan's overall surplus. MOFA pressure to preserve good relations with the United States, which after all bore most of the burden for Japan's physical security, threatened to interfere with JDA and industry plans. The MOF was also opposed to a domestic FSX because of the high cost of development, estimated by TRDI to be between $750 million and $900 million,[31] viewing the project as "a good way to pay more and buy less."[32]

TRDI, MHI, and the ASDF worked together to come up with a solution to save their plans for a *Hi no Maru* (Rising Sun) fighter that would satisfy all of the opposition and still meet the fighter replacement schedule that was supposedly critical to Japan's security. The solution they devised was called the Service Life Extension Program

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[29]Ibid., 68-69.

[30]Samuels and Whipple, 294-296. MITI's Aircraft and Ordinance division consistently supported a domestic aircraft.

[31]"Japanese Propose Domestic FSX Development," *Aviation Week and Space Technology*, 30 September 1985, 25.

(SLEP), and it was a windfall for proponents of a domestic FSX. SLEP involved upgrading F-4s and F-1s to extend their useful periods of service into the mid-1990s. This provided the delay that industry needed to develop its own fighter and it satisfied most of the domestic opposition to the aircraft. As Samuels and Whipple noted, the SLEP program was key to overcoming barriers that threatened *kokusanka* of the FSX:

> The SLEP strategy was a resounding success because it offered something to all parties. Budget officials at JDA and the Finance Ministry were delighted because it delayed funding new aircraft years into the future. The United States and MOFA were mollified temporarily, for much of the F-4J [upgrade] contract was slated for American avionics . . . MHI got a substantial contract and experience with integrating digital avionics, while [the ASDF] got uninterrupted deployment. More important, the SLEP contracts gave Japanese industry additional time to prepare, and perhaps most important, deployment rescheduled into the 1990s winnowed the field of potential competitors. Western planes designed in the 1970s would be technically obsolete.[33]

With time on their side, the JDA turned to TRDI in January 1985 for a formal feasibility assessment of a domestic FSX. On April 1 TRDI issued its initial report stating that domestic development was not only possible, but that Japan actually possessed the technological capability to make the aircraft one of the best fighters in the world. It would not be limited succeeding the F-1, but would potentially replace all of Japan's F-4EJ fighter-interceptors as well. The FSX would thus completely re-outfit not one but two categories of aircraft for the ASDF, and with the added performance requirements of an interceptor it would be difficult to find an existing foreign design that was acceptable. *Yomiuri Shimbun* reported that the JDA's request to TRDI was based on

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[32]Samuels and Whipple, 295.

[33]Ibid., 297.

an aircraft design that could carry two anti-ship and eight air-to-air missiles, was low-observable to radar, had a low-altitude combat radius of 450 nautical miles, utilized a fire-control computer twice as powerful as the one used in the F-15, and had a top speed of Mach 2.3. The aircraft was also to make extensive use of high-tech Japanese composite materials, electronic components, and domestic control-configured vehicle (CCV) technology, though it would use two license-produced foreign engines.[34] The requirements later changed to four anti-ship missiles, four air-to-air missiles, and a thrust-to-weight ratio greater than 1.0.[35]

The conclusion that such an aircraft was within the capability of Japan's aerospace industry was not surprising, considering TRDI itself had been involved with MHI for nearly ten years developing many of the technologies that the JDA wanted on the airplane. MHI and TRDI had focused on advanced composite structures, stealth technology, new metallurgical processes, avionics, fire-control software and CCV technology since the late 1970s, partly as a reaction to the black boxing of sensitive F-15 components and partly in anticipation of a formal request from the JDA to develop the

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[34]*Yomiuri Shimbun*, 2 April 1985, 1. CCV technology, which the *Yomiuri* article described but did not define, refers to a computer-aided flight control system. It utilizes small canards on the aircraft that give enhanced lateral and pitch control, enabling the pilot to reposition the aircraft in a number of different attitudes that would be impossible under manual control. Japan developed CCV technology in the early 1980s on a modified T-2 as part of a TRDI research program.

[35]Chinworth, 139. Thrust-to-weight ratio refers to the thrust produced by the engines (in pounds or kilograms) divided by the gross weight of the aircraft (in the same units). If it is greater than 1.0, the aircraft can theoretically accelerate going straight up just like a rocket. In 1985 there were no operational aircraft with a thrust-to-weight ration greater than 1.0, though a number have been deployed since.

FSX.[36] The T-4 project had also provided important design-phase systems integration experience to industry.

Armed with TRDI's favorable assessment, the JDA formally launched the FSX selection process in October 1985. Three familiar procurement options were officially put forward: off-the-shelf purchase of a foreign design, licensed production, or indigenous development of a new aircraft. That same month, ASDF Chief of Staff General Mori Shigehiro announced that three foreign aircraft were competing with the domestic concept put forth by MHI and TRDI. The three planes were the McDonnell Douglas F/A-18, the General Dynamics F-16, and the Panavia Tornado (a European fighter produced jointly by Great Britain, France, and Germany).[37] Cost and performance were to be the primary considerations in the selection process.

Despite the consideration of foreign designs, proponents of domestic development had devised a list of requirements for the FSX that effectively precluded any extant foreign aircraft. The JDA insisted that the new fighter have two engines because of Japan's high population density. If a fighter with only one engine had engine trouble, the argument went, then the chances were high that civilians could be injured or killed on the ground. A second engine provided a margin of safety that was put forth as non-

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[36]Chinworth, 134-137. For a discussion of the development of FSX-related technologies, see David A. Brown, "Japanese Industry Urges FSX Fighter Development Despite U.S. Opposition," *Aviation Week and Space Technology*, 21 September 1987, 47-48.

[37]Kōno Masaru, "Japanese Defense Policy Making: The FSX Selection, 1985-1987," *Asian Survey* 29, no. 5 (May 1989): 460.

negotiable. This effectively eliminated the Tornado and the F-16 from competition because both were single-engine fighters, though the Tornado had not been seriously considered from the outset.[38] The twin-engine F/A-18 came close to meeting the JDA's requirements, but it was not popular among ASDF pilots because it was developed as a Navy airplane.[39]

The JDA continued to enumerate reasons why there were no viable foreign alternatives for the FSX. Japan's unique geography and strategic position meant that it had a number of military requirements that no other countries faced, the agency argued. The proximity of Soviet air forces to Hokkaido meant that the new fighter needed to be stationed south of Matsushima in order to effectively carry out its support role. According to a former commander of the ASDF's Northern Air Defense Command, aircraft stationed in Hokkaido were likely to be destroyed in the first wave of a major Soviet attack as the enemy worked to establish air superiority.[40] That is where the 450 nautical-mile combat radius requirement originated (neither the F-16 nor the F/A-18 had a radius that large). When McDonnell Douglas later suggested upgrading the F-15J to fill

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[38]Ōtsuki Shinji, "Battle Over the FSX Fighter: Who Won?" *Japan Quarterly* 35, no. 2 (April-June 1988): 140.

[39]Chinworth, 144.

[40]"FSX *Sentei no Mondaiten: Bōei Shiirizu Dai 26 Kai Zadankai*" (Issues in FSX Selection: 26th Roundtable Discussion of the Defense Series), *Jiyu* (July 1987): 104-130. Former General Inaba Yoshiro went on to argue that the likelihood of the Soviets establishing air superiority obviated the need for a support fighter altogether since the planes would not stand a chance of getting near ground targets. What the ASDF needed, he argued, were more interceptors or an attack fighter capable of striking enemy airfields. His arguments about the likelihood of heavy losses in Hokkaido were used to justify range requirements for the FSX.

a support role or license producing the new multi-role F-15E, a contradicting argument emerged. According to this position the F-15, with its wide combat radius and great offensive capability in an attack role, would run counter Japan's strictly defensive military posture and would thus overstep the bounds of political acceptability.[41] Domestic FSX proponents were establishing a narrow range of requirements that no foreign aircraft could fill. Significantly, the JDA never published any formal threat assessments that justified its increasingly exclusionary list of FSX requirements.[42]

U.S. Involvement and Co-development

By early 1986, McDonnell Douglas and General Dynamics were beginning to believe that the Japanese were not really interested in procuring an existing aircraft at all, but were devising unrealistic requirements for the FSX in order to insure that their own non-existent "paper fighter" would win selection. The companies took up the issue with the Secretaries of Defense, Commerce, and State, and the U.S. government adopted a formal position on the FSX for the first time: the JDA should select an American fighter because it would be cheaper, it would enhance interoperability with U.S. forces, and it would improve the balance of trade.[43] The last issue, balance of trade, was not overtly linked to the FSX in early 1986 but it simmered just below the surface. The other issues,

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[41]Ōtsuki, "Battle Over the FSX Fighter," 143.

[42]Ebata Kensaku, "Japan's FSX Decision," *Jane's Defense Weekly* 7, no. 29 (9 August 1986): 214-216, cited in Chinworth, p. 138.

[43]Samuels, *Rich Nation*, 239.

cost and interoperability, were the focus of U.S. arguments. In 1985 the Plaza Accord had led to a major increase in the exchange value of the yen, making procurement or licensing of a U.S system dramatically cheaper than it would have been in preceding years. Congress, the Commerce Department, and U.S. manufacturers were all keenly aware of the implications of expensive yen on the FSX program.

The issue of interoperability was related to the increasing U.S. emphasis on burden sharing as part of the security treaty in the mid-1980s. The Department of Defense (DOD) viewed development of a world-class fighter by Japan as detrimental to the overall security relationship. Not only did DOD officials believe that a new Japanese fighter would complicate combined operations because of incompatibility with U.S. equipment, they also feared that an indigenous development program would be terribly inefficient and would siphon off scarce defense funds that could be better utilized for defense burden sharing in other areas.[44]

While both economic and military concerns over the FSX were growing in the United States, no one was yet suggesting that Japan purchase an American fighter off the shelf. Instead, the idea of joint U.S.-Japan development of a new plane based on an existing U.S. design emerged at this time. Assistant Secretary of Defense Richard Armitage informally raised the issue with JDA officials in Hawaii in January 1986. The Japanese, according to Green, "received the proposal with shocked silence."[45] The co-

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[44]Lorell, 106-107.

[45]Green, *Arming Japan*, 95.

development option received an official sanction in March of the same year when Secretary of Defense Casper Weinberger declared in a press interview that the U.S. would welcome co-development.[46]

By mid-1986 the FSX was being overtly linked to the trade imbalance by members of Congress. Senator John Danforth of Missouri, where both General Dynamics and McDonnell Douglas had corporate offices, became the most vocal critic of Japan's plans to produce the FSX on its own. "There's no excuse for Japan producing the airplane all by itself," he told reporters, "not with a $60 billion trade surplus over the U.S."[47]

With the issue becoming politicized, high-ranking officials in MITI and the JDA felt they had to at least entertain U.S. proposals for co-development. In July 1986 the JDA officially added co-development of a new aircraft based on an existing U.S. design as the fourth official option for FSX procurement. General Dynamics and McDonnell Douglas quickly filed co-development proposals, and the JDA was forced to postpone the final FSX decision amid concerns that a hasty selection of the domestic option would cause an unacceptable amount of tension.[48]

In early 1987 two events effectively sealed the fate of Japan's plans to produce its own FSX. First was a mission by Deputy Assistant Under Secretary of Defense Gerald

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[46]Kōno, 462.

[47]Quoted. in Lorell, 139.

[48]Kōno, 462.

Sullivan to assess the technological capabilities of Japan's aerospace industry. The purpose of the assessment was to determine if Japanese industry was actually possessed of a level of technological sophistication sufficient to produce an aircraft like the FSX. Sullivan's team visited MHI, TRDI, and a number of other facilities but reported that Japanese aerospace companies and the JDA refused to allow them to inspect many of the key technologies that they claimed to have developed. The team did get to observe some composite wing structures made by MHI and some flat-panel instrument displays, but it concluded that while "the Japanese had some interesting projects and innovative technologies under development [they] remained far behind the United States in overall system development and integration."[49] Sullivan's team came back to the U.S. and reported that while Japan may have been able to produce a fighter aircraft, it would not be nearly as capable as an American fighter and it would certainly cost much more. They also reported that indigenous development of the FSX was not really about the security of Japan or the needs of the ASDF, but that the project was being driven "by the technocrats and engineers at TRDI . . . and in industry, not the objective security interests of the nation."[50]

The next event was news that the Toshiba Corporation had exported sensitive U.S. submarine technology to the Soviet Union despite strict prohibitions against such activities. The "Toshiba Incident" enraged U.S. politicians who voted to block imports

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[49]Lorell, 148.

[50]Ibid., 149.

from Toshiba and began to call for more protection of defense technologies. The political fallout created by the incident must have convinced proponents of a domestic FSX that they were now fighting for a lost cause, because from that point forward the co-development plan began to gain ground. In June Weinberger visited Japan and strongly suggested that Japan agree to a plan to develop the new fighter based on either the F-16, F/A-18 or F-15. Japan countered with a proposal to co-develop an entirely new fighter not based on any existing U.S. designs, but the plan was rejected.[51] On October 2 JDA director Kurihara agreed to Weinberger's plan and announced that co-development of the FSX would be based on either the F-16 or the F-15, with Japan leading the co-development effort.[52]

On October 21 the JDA announced that it had selected the single-engine F-16 as the basis for the FSX. The decision puzzled observers because of the previous insistence that the FSX have two engines. According to documents circulated within the JDA, the decision was based on two factors: cost and the fact that the F-16 provided the greatest opportunity for Japan to incorporate the technologies that industry and TRDI had been developing for so many years.[53]

An MOU was signed in November of 1988 with a provision that any new technologies derived from the project (i.e. advances in F-16 technology) be provided to

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[51]Ōtsuki, "Battle Over the FSX Fighter," 143.

[52]Ibid.

[53]Green, *Arming Japan,* 102.

the United States free of charge. Any non-derived technologies (those TRDI had been developing) could be purchased by the United States. The MOU was later "reviewed" by the Bush administration after critics in Congress argued that it was a giveaway of U.S. fighter technology, but the review failed to change the agreement. In any case, it was clear that the United States was no longer interested in supporting the development of Japanese industry as it had been in the years after World War II and throughout most of the Cold War. Indeed, the FSX caused the U.S. to shift its emphasis away from purely military concerns and to consider the industrial and technological aspects of security. As the common enemy that faced the U.S.-Japan alliance began to weaken in the late 1980s, economic security (which Japan had emphasized from the beginning of the relationship) suddenly found a voice in the United States. Being the guarantor of Japan's physical security, the U.S. used its position to affect the outcome of the FSX procurement decision and prevent Japan from achieving all of its technonationalist aims.

A closer look reveals that Japan's national security strategy remained fairly intact throughout the FSX project, however. Mark Lorell and Michael Chinworth both argued that the ultimate irony of the FSX deal is that it may have resulted in more opportunities for technological development of the Japanese aerospace industry than a completely indigenous design would have achieved. That is because it afforded engineers the opportunity to work with a tested and proven design and to continue to absorb important technologies from the U.S. while they gained experience in systems integration and

modification.[54] The GAO differed somewhat in its conclusion, noting in a 1997 report that an indigenous design would have been more beneficial for industry but nonetheless recognizing the potential gains of the program:

> Japan will continue to gain experience and capability from the F-2 program, although less capability than if it had pursued indigenous development. Specifically, DOD officials believe that the F-2 program will significantly enhance Japan's systems integration capability–that is, incorporating subsystems and technologies into the airframe.[55]

Despite the fact that Japan suffered a minor security strategy setback in that it could not completely indigenize the FSX, "the program [was] consistent with the Japanese government's strategy of making defense development and production as indigenous as possible."[56] The skills and technology gained through the FSX will undoubtedly lead to a push for greater indigenization in the future. The JDA has already indicated its desire to produce a proof-of-concept "Rising-Sun" fighter early in the 21st century.[57]

In terms of diffusion of new technology and nurturance of the aerospace industry, the FSX was an excellent example of Japan's technonationalist security strategy. Many of the "requirements" for the aircraft have been dropped in the years since development

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[54]Lorell, 381. See also Chinworth, 158-160.

[55]U.S. General Accounting Office, *U.S.-Japan Fighter Aircraft: Agreement on F-2 Production,* Report to Congressional Requesters (Washington, D.C.:U.S. Government Printing Office, February 1997), 19.

[56]U.S. General Accounting Office, *U.S.-Japan Cooperative Development: Progress on FS-X Program Enhances Japanese Aerospace Capabilities*, Report to the Congress (Washington, D.C.: August 1995), 54.

[57]Samuels, *Rich Nation,* 244.

began, just like the two-engine requirement was suddenly dropped when it was no longer needed to exclude foreign aircraft from consideration. Incidentally, the Sullivan report appears to have been correct in its assessment of Japan's ability to produce the FSX. As of January 2000, the plane is still at least a year and half away from being operational despite original plans that it would enter active service in 1998. It has been plagued by cost overruns, technical problems, and design changes. Notable among them was abandonment of TRDI's CCV technology when it proved too difficult to integrate into the final design. Mitsubishi's composite wings have also proven to be a consistent source of headaches, developing cracks on multiple test flights. Co-cured composite wing technology and inertial navigation systems developed for the FSX have been diffused into commercial industry applications, however, indicating that the project has contributed to the domestic technology base of Japanese industry consistent with the country's broader technonationalist security strategy.[58]

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[58]U.S. General Accounting Office, *U.S.-Japan Cooperative Development*, 59.

CHAPTER 4
INDIGENOUS DEVELOPMENT OF MILITARY SATELLITES

In the preceding chapters I focused on procurement of military aircraft to demonstrate that a technonationalist ideology drives Japan's security policy. In this chapter I shift my focus to another type of aerospace procurement: systems for use in outer space. I begin by outlining the history of Japan's space program, noting the institutions and projects that have been associated with space development policy. I then present the case of Japanese plans to develop and deploy a constellation of indigenous reconnaissance satellites in the first decade of the twenty-first century. I conclude that while this plan is based on the need to counter a perceived threat to Japan's physical security, details of the proposed system indicate that technological concerns still enjoy a higher priority than military concerns in the country's security policy.

The Historical Development of Japan's Space Program

Unlike the aircraft industry, which produces over 80 percent of its products for military application, Japan's space industry developed on a largely civilian basis since its humble beginnings in the mid-1950s (albeit with mostly government funding). Three organizations have served as the primary vehicles for development of the industry: the Ministry of Education, the Science and Technology Agency (STA), and to a lesser degree the JDA via TRDI. The Ministry of Education is involved through the Institute of Space and Astronautical Science (ISIS), a research organization attached to the University of Tokyo that engages in scientific experimentation and development of launch

technologies. The Science and Technology Agency oversees the National Space Development Agency (NASDA), which is responsible for developing satellite and launch options for both commercial and scientific applications. TRDI has been peripherally involved in industry development over the years with research on military rockets and defensive missile systems. Private corporations have also played an active role in the growth of the space program through Keidanren's Space Development Promotion Council (SDPC) since 1961.[1]

Official government involvement in the space program began in 1960 with the establishment of the Space Science and Technology office within the STA. In 1964 the STA created another body, the National Space Development Center, to commence full-scale work on an indigenous launch program. This organization was transformed into NASDA by the Diet in 1969, assuming responsibility for plans, programs, and basic space-related policy.

Along with the law that created NASDA, the Diet passed a resolution expressly forbidding military uses of outer space. Japan's official space development policy, set forth in the same year, reflects the spirit of the Diet resolution: "Space activities will be carried out solely for peaceful purposes, striving to meet various social needs in harmony with national resources."[2] In 1985 Prime Minister Nakasone said that information gathering, even by the JDA or the SDF, did not constitute a military use of space since it

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[1]Drifte, 65.

[2]Japan National Space Development Agency, *Space in Japan 1988-89* (Tokyo: NASDA, 1988), 1.

was a passive activity. Politicians have debated the issue since, but the general consensus is that military satellites aimed at gathering information do not violate the 1969 Diet resolution.[3]

In 1978 the Space Activities commission, an advisory organ to the Prime Minister, revised the development policy and devised the Space Development Program, which reaffirmed the emphasis on peaceful space applications and stated that Japan should not try to produce all of its space-related hardware domestically until it had developed the technical capabilities to carry out a comprehensive space program on its own.[4] This approach enabled the space program to achieve a high level of technological sophistication relatively rapidly by importing technology and laid the foundation for later commercial ventures.

The structure of the space program is such that a number of institutions in addition to NASDA have close ties to the agency's activities. For example, utilizing agencies and private enterprises carry out most satellite research and then forward it on to NASDA for development. Utilizing agencies include the National Aerospace Laboratory, the Japan Meteorological Society, the Ministry of Posts and Telecommunications, and even MOFA as I explain in the next section. Most scientific satellites are an exception since ISIS handles both research and development by itself. NASDA has historically

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[3]Green, *Arming Japan*, 130-131.

[4]Saitō Shigebumi and Kuroda Yasuhiro, introductory essay to a volume on Japan's space program, *Acta Astronautica* 7, no. 8-9 (1980): 925-926.

used approximately 80 percent of Japan's space budget for its development projects while ISIS and utilizing agencies have used about 10 percent each.[5] NASDA successfully launched its first satellite in 1975 as an engineering test project.

In addition to satellites, NASDA has been associated with launch vehicle development since its days as the National Space Development Center in the early 1960s. The first significant vehicle it developed was the N-I, a small rocket capable of placing light satellites in orbit. The N-I first flew in 1975 and was in service until 1982, when it was succeeded by the larger N-II. Both the N-I and the N-II were based on technology Japan imported from the U.S. Delta rocket.[6] In 1991 the H-I launch vehicle replaced the N-II, and one of its three stages was also based on U.S. technology. Its inertial guidance system, however, a very advanced piece of hardware that took years to design, was developed entirely in Japan.[7]

In the mid-1990s Japan moved from rockets based on imported technology to a completely indigenous launch vehicle, the H-II. Table 7 summarizes the characteristics of rocket programs through the H-II. Note that the H-II is much bigger and has significantly greater payload capacity than the rockets based on the Delta. NASDA developed the H-II as a vehicle for entry into the commercial space market, hoping to

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[5]Ibid., 931.

[6]Japan National Space Development Agency, 19.

[7]Ibid.

capture some of the launch business of Europe's Arianne space program with the ability to launch large communications and earth-observation satellites.

Table 7: NASDA's Major Rocket Programs

	N-I	N-II	H-I	H-II
Overall length	36.2 meters	35.4 meters	40.3 meters	49.0 meters
Total weight	90 tons	135 tons	140 tons	256 tons
Payload capacity	130 kg	350 kg	550 kg	2.2 tons
Number of stages	3	3	3	3
Propellant	Liquid & solid	Liquid & solid	Liquid & solid	All liquid

Source: Adapted from Japan National Space Development Agency, *Japan in Space 1988-89* (Tokyo: NASDA, 1988), 21.

The first commercial H-II launch took place in August 1996 under the auspices of Rocket Systems Corporation, a public company made up of 73 aerospace and electronics firms. The group successfully placed two domestic satellites into orbit: an ISIS earth-observing system and a communications satellite for a national association of ham radio operators. Though the launch marked the beginning of commercial operations for the space program, its high costs kept most business at bay. The one thing that the H-II did have going for it was NASDA's record: since 1975 only one launch in 29 had failed, a remarkable accomplishment considering the high failure rate of launches in other countries.[8] Hopes for reliability-based marketing came crashing down in 1999, however, when an H-II failed to put its payload into the proper orbit in February. Another rocket, in November, had to be destroyed (with its satellite payload) after flying off course shortly after liftoff. The Rocket Systems Corporation decided to abandon the H-II after the

[8]"H-2 Rocket Orbits 2 Satellites, Boosts NASDA Morale," *The Daily Yomiuri*, 18 August 1996, 1. English translation by Asia Intelligence Wire.

failures and plans to deploy a new launch vehicle, the H-IIA, sometime in 2000. Hopes of the commercial space industry are pinned on the H-II, which industry expects will not only enable Japan to enter the business of launching foreign satellites, but will also provide it with a means of marketing a "package deal" of commercial satellites produced in Japan with indigenous launch capability for foreign customers.[9]

While it has not yet become commercially competitive and despite its recent launch failures, Japan's space industry has achieved a level of technological sophistication that places it among the most advanced industries in the world. In 1990 Japan became the only third nation to orbit a satellite around the moon (after the U.S. and the Soviet Union), and it currently has a probe on its way to Mars to conduct scientific experiments. With capabilities like these and the advent of a more cost-effective launch system, Japanese firms will easily be in a position to compete with U.S. and European space ventures for commercial contracts in the future.

The Plan for New Satellites

Eyeing the potential for commercial growth in the space industry, MITI issued a report in July 1996 emphasizing the need to continue developing the industry's technological capabilities. In particular, the report noted that Japan should focus on development of non-stationary satellites that could be developed "taking advantage of the

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[9]"Japan Gears Up for Commercial Satellite Business," *Japan Space Net Online News Service*, 12 April 1997; available at http://spacer.com/spacenet/text/sat97-b.html; Internet.

high level of expertise of Japanese companies."[10] In other words, MITI wanted to spin on some of Japan's advanced commercial technologies to a new generation of satellites. The report went on to emphasize the high cost of developing a commercial space industry and reiterated the need for extensive government funding, though it predicted an enormous return on the investment: MITI expected the size of the space industry to grow three times by the year 2010 because of increased commercial activity.[11]

A Spy System

In May, two months before MITI released its report, Prime Minister Hashimoto had surprised observers when he told the *Asahi Shimbun* that Japan was considering plans to build a reconnaissance satellite for national security purposes. "Should a concrete need arise," he said, "we will look into it as necessary."[12] As if to underscore its need for information from space, Japan signed an agreement with the U.S. the following month to obtain data from American spy satellites including high-resolution images and warning of impending missile attacks.[13]

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[10]"Report Challenges Japan to Invest Energy in Non-Stationary Satellite," *Dempa Shimbun*, 3 July 1996, 2. English translation formerly available online by Comline Business Data.

[11]Ibid.

[12]Quoted in Kyle T. Umezu, "Early Bird Tweaks the Law," *Japan Space Net Online News Service,* 11 May 1997; available at www.spacer.com/spacenet/text/spy-97a.html; Internet.

[13]Todd Crowell, "The Nations Japan Targets: Star Wars," *Asiaweek Online*, 12 July 1996; available at http://cnn.com/ASIANOW/asiaweek/96/0712/nat1.html; Internet.

If the Prime Minister's remarks were an indication that Japan was moving toward military applications of outer space, what followed was a confirmation. In August, following the report from MITI, MOFA formally requested 10 million yen (about $100,000) of its fiscal 1997 budget to investigate the possibility of Japan developing its own spy satellites.[14] This was an interesting change from the role MOFA has traditionally played in matters of military procurement: rather than advocating the purchase of information or equipment from the U.S. with an eye toward maintaining harmonious alliance relations, MOFA was taking the lead on development of an indigenous system. MOFA's position reflected the changing nature of U.S.-Japan relations in the 1990s, characterized by a weakening of the Japanese economy and reduced calls for the outright purchase of U.S. military hardware.

Later in the year the government approved MOFA's budget request and established that primary responsibility for developing the spy satellites would rest with MOFA and the Science and Technology Agency via NASDA. The JDA, which suffered an internal split between *naikyoku* that wanted to import satellites from the United States and those that wanted Japan to develop its own, was bypassed in an effort to avoid raising the ire of pacifists and neighboring countries that might react if the program was linked too closely with the military establishment.[15]

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[14]*Mainichi Daily News*, 21 August 1996.

[15]"*Shin Renritsu wa Fukuin Ka: Jiji Renritsu no Uragawa*" (Is the New Alliance Good News? Behind the Liberal-LDP Alliance), *Shuukan Posuto* (5 February 1999); online edition available at http://206.217.210.33/jp/990205jp/news/news_1.html; Internet.

According to some reports the JDA had been pressuring NEC and Mitsubishi Electric Company (MELCO) to develop spy satellite technology since the early 1990s, but some in the agency shifted their focus to emphasize arrangements that would allow the firms to process and resell high-resolution imagery from commercial U.S. satellites instead of Japan building its own.[16] The shift seems to have come after a NASDA project called the Advanced Land Observation Satellite (ALOS) took longer to develop than expected. The ALOS project, which was funded through NASDA's environmental observation budget for mapping and research, will provide imaging resolution around 2.5 meters when it is launched in 2002 (meaning its cameras can make out all objects on the ground larger than 2.5 meters). This is inferior to images commercially available from U.S. satellite operators, which are around one meter. Rather than take its chances with inferior technology, the JDA decided to opt for the "even more direct and less problematical U.S. purchasing option."[17]

In 1997 preliminary research for Japan's spy satellites continued to move forward despite the JDA's growing affinity for U.S. satellite information. One element taken as a given for the new satellites, if and when they were built, was that they would be the type described in MITI's 1996 report. There are essentially two types of satellites: low-earth orbit, or LEO satellites, and geostationary (sometimes called geosynchronous) satellites. The former type is what the MITI report referred to when it mentioned non-stationary

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[16]Umezu, "Early Bird Tweaks the Law."

[17]Ibid.

satellites. LEO satellites are considered non-stationary because they do not remain above the same spot on the earth. Their relatively low altitude, which is typically 200 to 500 miles above the surface, means that they must travel very fast (about 17,000 miles per hour) in order to avoid being pulled out of orbit by gravity. LEO satellites make a complete circle around the planet in 90 minutes. Geostationary satellites, by contrast, orbit the earth exactly 22,300 miles above the surface. At that range their orbital period coincides with the rotational period of the earth, meaning that a geostationary satellite maintains a fixed position in the sky relative to the surface of the planet.[18]

MITI's report suggested that Japan develop LEO satellites because they were particularly conducive to utilizing domestic high technology. Two applications that could employ advanced technology are high-resolution surface imaging and mapping. These are typical functions of LEO satellites since low orbital altitudes make picture taking possible. Worldwide intelligence gathering is an associated function because LEO satellites can scan the entire surface of the earth, though it takes nearly three days for a single satellite to return to a position where it can observe the same spot twice.[19] By placing the focus of Japan's satellite development on LEO systems, MITI encouraged the production of imaging satellites over other options. This is significant because it directly

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[18]Information on the different types of satellites came from the Lockheed-Martin Corporation.

[19]Reconnaissance satellites are almost always in polar orbits, which are low-earth orbits around the north and south poles. As the satellites move from north to south, the earth rotates beneath them from east to west. By taking pictures on successive orbits, the satellites can scan the entire surface of the earth in slices, similar to peeling an orange.

affected the military mission of any proposed spy satellite program. If Japan's primary objective were to monitor a single country or region, say for missile launches, then imaging satellites would have been totally inappropriate. A geostationary satellite could monitor such information 24 hours a day and send back data in real time, while a LEO satellite or even a constellation of LEO satellites could only see the region of concern for a few hours each day and would be incapable of transmitting real-time intelligence information directly to Japan during a portion of each orbit.

It did not take long for industry and government officials in the United States to take note of the contradictions between Japan's supposed military needs, which centered on detecting North Korean missile launches, and its plan to develop spy satellites with imaging capability. It appeared that the plan was, at least in part, a component of an industrial strategy designed to increase the technological competitiveness of domestic space manufacturers. Despite the virtual reversal of fortune that had taken place in the two countries' economies since the FSX controversy, it appeared for a time that the spy satellite plan would launch another battle linking defense and trade issues.

The Kyōdo News Service reported in early 1998 that U.S. officials were expressing opposition to the satellite plan. According to the report, the DOD was considering suspension of all technical assistance to Japan if development of the satellites continued. The reasons for the opposition were reminiscent of the FSX:

> American officials are concerned that the Japanese would be duplicating American capabilities, and that this would not be an efficient use of Japanese resources. . . . [They claim that] each nation should seek to exploit areas in which they have superior capabilities. Duplicating superb American capabilities, they

argue, both violates the spirit of the treaty and squanders scarce resources on an unnecessary capability.[20]

U.S. opposition was silenced on August 31, 1998 however when North Korea joined the debate by launching a three-stage Taep'o-dong ballistic missile that over flew Honshū and crashed into the Pacific Ocean. Japanese government and defense officials were forced to wait hours before U.S. intelligence sources handed over information on the missile's trajectory and probable purpose, adding fuel to calls for an all-Japanese intelligence capability.[21]

Politicians, bureaucrats, and business leaders immediately elaborated the need for Japan to deploy its own spy satellites and reduce its dependence on U.S. information. The DPC used the occasion to outline an entire set of proposals for improving Japan's air defense. Released on September 5, the DPC proposals called not only for the development and launch of indigenous spy satellites, but also for the creation of an entirely new "C4I" (command, control, communications, computer, and intelligence) system for the JDA. The DPC recommended that the system be developed by "tapping cutting-edge civilian technologies."[22]

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[20]"U.S.-Japanese Squabble Over Japanese Spy Satellite," *Stratfor Online News Service*, 9 January 1998; available at www.stratfor.com/services/giu/010998.asp; Internet.

[21]"How Safe is Japan? National Intelligence System Key to Air Defense," *The Daily Yomiuri Online*, 8 December 1998; available at www.yomiuri.co.jp/security/how_safe1.htm; Internet.

[22]"Japan Needs 'C4I' Defense System, Spy Satellites: Keidanren," *Jiji Press English News Service* (Tokyo), 5 September 1998.

By October, MELCO submitted a proposal to the government for four LEO spy satellites that it said could be developed and launched by 2003 for ¥200 billion (about $2 billion). Two of the satellites would carry optical sensors (cameras) and two would utilize synthetic aperture radar to enable imaging through cloud cover. The resolution of the proposed satellites would be about one meter (U.S. spy satellites reportedly have a resolution of just a few centimeters).[23] The MELCO proposal was greeted with enthusiasm in the Diet, but as Simon Mansfield noted it was clearly aimed at more than detecting missile launches: "The timing of the Korean incident is mana [*sic*] from heaven for Mistubishi, as it will allow the company to lock in significant government funding for the first phase of its telecommunication satellite commercialization plan–a market which it hopes to enter by 2005."[24]

Another option considered by the Diet was modification of NASDA's ALOS project. The ALOS could provide both visual and synthetic aperture radar images, but would not have the resolution of the new satellites proposed by Mitsubishi. In addition, since only one ALOS satellite was planned, it would only be able to monitor North Korea intermittently. Within weeks, however, NASDA announced that ALOS would not be converted to an intelligence-gathering satellite. Instead, the agency moved the ALOS launch date up six months in order to facilitate the development of indigenous spy

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[23]"Mitsubishi Recce Plan Gains Ground in Diet," *Aviation Week and Space Technology* (November 9, 1998): 34.

[24]Simon Mansfield, "Mitsubishi Eyes Billion Dollar Satellite Trough," *Japan Space Net Online News Service,* 3 November 1998; available at www.spacer.com/spacenet/text/spy-98a.html; Internet.

satellites. With the ALOS in orbit for an extended period of time before the proposed launch of the spy system, engineers would have a chance to evaluate its performance and apply what they learned to the development of the new satellites.[25] The advantage of the ALOS conversion option had been that it would allow Japan to tout the satellite as a "multipurpose" system that was not designed for military use, thus skirting controversy that might arise about the 1969 Diet resolution that limited Japan to peaceful uses of outer space. MELCO emphasized in its presentation that the four-satellite system it proposed could also be used for research and scientific purposes.[26]

On November 6, Prime Minister Obuchi's cabinet endorsed plans to launch spy satellites but did not make a determination on how to procure them. A debate ensued, with supporters of the MELCO plan on one side and those who advocated purchasing U.S. satellites on the other. The day after the cabinet's endorsement, *Yomiuri Shimbun* printed an article specifying exactly what kind of deficiencies Japan could expect in a domestic system. "[The proposed satellites] cannot detect a missile launch . . . it will be possible to identify such objects as ballistic missiles, fighter planes, and choppers . . .[but] when it comes to whether or not a missile has been actually launched, [it] cannot be

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[25]*Asahi Shimbun,* 17 November 1998, 3.

[26]*Nikkan Kōgyō Shimbun*, 23 October 1998, 15. English translation by the U.S. Embassy in Japan; available online at http://wnsv.iuj.ac.jp/subscription/DailySummary/0296.html; Internet.

detected without the aid of stationary satellites for round-the-clock monitoring."[27] With no plans to develop such satellites, the only value of a domestic development program would be deterrence and, more importantly, sustained funding and demand for the domestic satellite industry.

Former Minister of Foreign Affairs and LDP Diet member Nakayama Tarō led the group that supported purchasing U.S. satellites. "I don't care personally if we produce the satellites domestically or import them, I just wonder if Japan can really catch up with American technology by 2002. We also have to think about the burden of development costs on the taxpayers. The answer from the country's perspective is obviously that we should import," he said.[28] He was joined by other members of the LDP, including former JDA chief Tamazawa who reportedly asked who would take responsibility when the Japanese-developed system proved inadequate to meet the country's defense needs.[29] Chief Cabinet Secretary Nonaka Hiromu led the government push for indigenous satellites, dismissing the claims of LDP members like Nakayama and Tamazawa that development was impractical.

Significantly, the U.S. suddenly dropped its formal objections to indigenous development about the same time the Diet began to entertain procurement options. When Nakayama visited Washington later in November, U.S. defense officials informed him

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[27]*Yomiuri Shimbun,* 7 November 1998, 3. English translation by the U.S. Embassy in Japan; available online at http://wnsv.iuj.ac.jp/subscription/DailySummary/0299.html; Internet.

[28]Quoted in "*Shin Renritsu wa Fukuin Ka.*" Translation is my own.

[29]"*Shin Renritsu wa Fukuin Ka.*"

that they would support Japan's plans whether the satellites came from U.S. manufacturers or were produced in Japan. The *Mainichi Daily News* reported that the U.S. had actually pledged its support back in September, immediately after the North Korean missile launch, during a meeting of the bilateral Security Subcommittee in Tokyo.[30] Secretary of Defense William Cohen confirmed in January 1999 that the U.S. was willing to go along with whatever procurement decision the Diet adopted, and even pledged to supply unclassified U.S. imaging technology in order to help Japan meet its launch date goal.[31] This statement was a clear change from the earlier U.S. position and it was counter to U.S. government sensitivities about any technology transfers involving reconnaissance satellites.

Cohen's statement went on to provide some indication of why the U.S. position had changed so completely and abruptly despite clear evidence that Japan's proposed system would do more for industry than military intelligence. Along with U.S. support for Japanese satellites, he mentioned that he hoped the North Korean missile launch would help Tokyo see the value of contributing to joint R&D on a theater missile defense (TMD) system, something that the Clinton Administration has been committed to

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[30]"Government: U.S. to Support Satellite Program," *Mainichi Daily News,* 10 November 1998.

[31]"Cohen Says U.S. is Prepared to Help Japan Develop Own Spy Satellites," *Japan Digest* 10, no. 7 (January 12, 1999); online edition available at http://205.187.221.13/complete/defense/19990112-defense-1.html; Internet.

developing despite its high price tag and uncertainty of success.[32] By signing Japan and other countries on as partners in TMD development, which would ostensibly provide ballistic missile defense to all countries who contribute, the U.S. could spread R&D costs out among its allies. It seems that the U.S. took advantage of the perceived need for increased security in Japan that surfaced after the missile launch to help subsidize one of its own programs. Any increase in the competitiveness of Japan's space industry was acceptable compared to the threat of losing Japan's support on TMD. As one senior MOFA official put it, U.S. support for Japan's spy satellite program amounted to "consideration for working together to promote the TMD initiative."[33] In April 1999, with pledges of U.S. support, the Diet formally decided to develop Japan's new satellites at home utilizing critical U.S. technology.

The two governments signed an agreement on joint TMD research on August 13, 1999. The MOU was followed by Cohen's reiteration of U.S. support for Japan's indigenous satellite program. An agreement on the transfer of U.S. satellite technology, the first of its kind with any country, was then concluded on September 28. The satellite MOU contained a number provisions regarding the use of imported U.S. technology: 1) Japan had to develop adequate measures to protect sensitive information from leaking to foreign countries; 2) access to the technology had to be restricted to the minimum number of people necessary to produce the satellites; and 3) Japan was forbidden from utilizing

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[32]Ibid.

[33]*Yomiuri Shimbun*, 7 November 1998, 3.

the technologies for any purposes (including commercial) other than incorporation into reconnaissance satellites. The MOU also emphasized that no militarily sensitive technology would be transferred, only commercial technology necessary to help Japan achieve the same kind of resolution available commercially from U.S. sources.[34]

The Future

It is clear that both governments will gain something from Japan's spy satellite program. Japan will get the opportunity to develop and deploy its own reconnaissance satellites, insuring that MELCO and NASDA will have consistent customers for the foreseeable future. The increased demand will undoubtedly help bring down the costs of satellite integration and launch vehicles, critical steps in the development of a commercially viable space industry. The U.S., for its part, will get a partner in TMD research. Only time will tell if the concessions made to Japan in the form of satellite technologies will come back to haunt U.S. space firms. The conditions established in the satellite MOU will ostensibly prevent widespread diffusion of LEO imaging technology throughout Japanese industry, but if the past is any indication MITI and Keidanren will find a way to incorporate the new technologies into as many products as possible.

The important question to ask about the satellite program in terms of Japan's security strategy is whether or not it was motivated more by military necessity or technonationalist ideology. It would be incorrect to argue that military concerns did not

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[34] *Yomiuri Shimbun*, 28 September 1999.

play a role in the decision for *kokusanka* of the satellites. The threat of North Korean missiles is real, and the Taep'o-dong launch caused genuine concern in Tokyo. As I have shown, however, even before the launch Japan was actively pursuing a specific kind of satellite development program. The launch did not change that program, but increased support for it on all sides. It is almost as if no one ever stopped to ask whether the proposed system could actually do something to improve Japan's physical security. Technical details of the proposed system make it clear that the answer to that question would be "no" since the satellites cannot even monitor missile launches. Then there is the issue of response. Even if the new imaging satellites reveal some sort of threat on the ground, say a missile being prepared for launch, Japan has made no efforts to improve its ability to respond to the threat. Defense officials would still be absolutely dependant on geosynchronous U.S. early-warning satellites to tell them if an actual launch took place. As the Stratfor News Agency noted in a report about the satellites, "there is no point to an intelligence capability if you lack both the resources and the intention to act on the intelligence."[35] In the final analysis, it is clear that Japan's new satellites were driven much more by industrial than military concerns.

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[35]"Japanese to Create a Spy Satellite System," *Stratfor Online News Service,* 2 November 1998; available at www.stratfor.com/services/twa/110298.asp; Internet.

CHAPTER 5
CONCLUSION

Recognizing Technonationalism

The cases I examined in this study support the conclusion that an ideological predisposition to acquire new technology in order to enhance the competitiveness of domestic industries plays the central role in Japan's security policy. This technonationalist ideology is apparent in each of the cases of military aerospace procurement that I considered, consistently overriding military threats, utility, cost, and other factors as a determinant of policy. Japan does not procure military aerospace equipment primarily as a means of providing for its physical defense. Instead, the country views procurement policies, like the larger national security policy of which they are a part, as a means of defending something it considers much more vulnerable: long-term economic well-being.

That well-being will not come about directly on the backs of the aircraft and satellites I examined. It is easy to see that military production in itself was not the ultimate goal of any of the systems in this study. With defense accounting for such a minuscule amount of industrial output, less than one percent, it would be foolish to conclude that Japan pursued indigenization of aerospace production because of the lucrative market for its weapons. Someday there may be such a market, but the requisite political changes that would enable it to emerge are nowhere in sight.

Another possible interpretation of the effort to secure military aerospace technology is that Japan sees high-tech weapons as important to defending itself. There is some evidence to support this interpretation. Certainly the pilots of the ASDF would not be opposed to flying the latest and greatest airplanes if they had to go into a combat situation, and if the airplanes are produced at home all the better. North Korea's missile launch demonstrated that there is indeed a military rationale for Japan to have high-tech, capable defense. But if countering military threats is so important to the Japanese, why does the country not respond to real-world political developments as a "rational actor" should? A high-tech FSX produced with domestic technology might be justifiable in military terms, but how do rational actors justify extending the service lives of old F-4s and F-1s *decades* now beyond obsolescence while they wait for the technological kinks in the F-2 to be ironed out? Imaging satellites will increase Japan's ability to conduct worldwide surveillance, but would a rational actor not at least try to develop a system that could warn of impending missile attacks if that were the threat?

Yet another possible explanation for the technology-hungry strategy is that Japan wants to enter the commercial aerospace market. There is evidence to support this idea as well. The YS-11 was a clear attempt to try and apply fresh know-how acquired through licensed production of military airplanes to a commercial endeavor. New imaging capabilities emerging from the spy satellite program will also likely find their way into related commercial products in the near future. The market for high-resolution satellite images is booming, and Japan is developing the technology it needs to be a part of the boom at an opportune time.

But the YS-11 was a commercial failure, and Japan will never be competitive in the satellite market if its expensive rockets keep failing to put their payloads in orbit. Movement from military production into related commercial production definitely accounts for some of the motivation behind Japan's security policy, but certainly not for all of it.

So what is at the heart of Japan's strategy? The cases in this study showed that all of the explanations presented above cannot account for policy. The issue is not that Japan emphasizes technological security; that is clear enough. The issue is why it emphasizes technology. It is not because of an insatiable desire to possess the best weapons. Nor is it because of a perceived need to confront the armies of an enemy. It is only partially to spin-off military technologies to relevant sectors of the commercial economy.

The real reason, the predominant one, is technonationalism. T.J. Pempel summarized it as follows:

> Japan has today reached a level of sophistication in its economy such that it can no longer continue to play catch-up, depending heavily on borrowed technologies and applied commercial research to achieve high economic growth. Instead, numerous Japanese industries are now at a point where continued international competitiveness requires that they be active in primary research in cutting-edge technologies, despite the absence of guarantees of immediate commercial payoffs. Such cutting-edge technologies can no longer be conveniently differentiated into hermetically sealed categories labeled "military" and "nonmilitary." Instead, developments in such areas as space research, semiconductor lasers, ceramic and alloy materials, avionics, artificial intelligence, optical data storage, and a host of other areas are characterized by a blurring of the lines between civilian and military applicability . . .[1]

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[1]T.J. Pempel, "From Trade to Technology: Japan's Reassessment of Military Policies," *The Jerusalem Journal of International Studies* 12, no. 4 (1990): 3.

In aerospace there has been a clear effort to indigenize, nurture, and diffuse technology since the first F-86 rolled off the assembly line at MHI in 1956. Even before the industry reached the level of sophistication that Pempel referred to there was a movement to utilize production as a means of channeling talent and resources into a reservoir of domestic technology. Technology has always been the goal; F-86s, F-15s, FSXs and spy satellites are the real "spin-offs."

Of course, fighter jets and spy satellites do constitute military capability, and the capability that Japan developed as a result of these programs cannot be ignored. Whatever the motivation for particular procurement policies, it is a fact that the systems I considered in this study have increased Japan's ability to fight wars. As such it would be incorrect to conclude that greater military capability was not a factor in the policy process. In fact, one of the consequences of Japan's push for technology has been an increased ability to design and produce weapons of all types. Technonationalism therefore does not have strictly economic implications; it also serves a military purpose. The ability to autonomously produce weapons is a critical part of any country's defense policy, and Japan is no exception. What this study has shown, however, is that the weapons themselves remain a secondary goal. Technology associated with weapons has been the primary objective of Japan's procurement policies. One thing is clear, however: Japan's strategy has succeeded in producing an aerospace industry with a level of technological sophistication that could easily be used to transform the country into a military power. For the time being, such a transformation remains politically unimaginable. The fact that it is a technical possibility, however, warrants consideration.

Preserving the Security Environment

In the introduction I noted two factors that make it possible for technonationalism to play such a significant role in security policy: 1) Japan's isolation from balance of power politics vis-à-vis its military alliance with the United States, and 2) the institutional structure of Japan itself that allows heavy involvement of developmentally-minded bureaucrats in the policy process. The cases I examined show how changes in the first factor are moderated by the second.

Regarding isolation, cases of licensed production attest to the fact that alliance relations were highly conducive to Japan's drive to obtain (and supplant) technology during most of the Cold War. As the United States shifted its emphasis from military to economic security in the late 1980s, however, Japan had a more difficult time pursuing policies that would lead to greater technological autonomy. The FSX represented a compromise of Japan's strategy to indigenize and independently develop as much technology as possible with the changing demands of its alliance partner. In the late 1990s the U.S. shifted back the other direction with its plan to develop TMD and relations once again became conducive to Japan's technonationalist ideology, paving the way for domestic development of spy satellites. Throughout these shifts, Japan remained relatively isolated from international balance of power politics. The effect of the changing U.S. emphasis did bring Japan into some level of conflict with the U.S. itself, but it never resulted in increased exposure to the realist world of international politics.

The second factor, institutional structure, helps to maintain consistency in security policy despite fluctuations in relations with the U.S. An informal consensus exists among institutions, Katzenstein and Ōkawara wrote, "That the objective of Japan's defense related industrial policy does not differ in any significant way from the general principles informing Japan's industrial policy. Japan should develop Japanese technologies as far and as fast as possible."[2] When the U.S. began to oppose Japan's proposal for the FSX, for example, it was bureaucrats with an eye on the future that directed changes in the program. MOFA could not allow the relentless pursuit of technology in the FSX case to disrupt relations to the point that it caused permanent damage to the alliance. Doing so would have eroded Japan's position of secure isolation, one of the critical factors that allowed it to pursue a technonationalist security strategy in the first place. MOFA, together with similarly minded organizations and individuals within MITI and the JDA, opted to oppose the consensus on technology in order to preserve Japan's ability to come back and fight another day. In the long run, the technonationalist ideology is evident in the policy preferences of all of the institutions that affect security in Japan.

A Final Word

It would be accurate to conclude that Japan's military aerospace procurement policy has indeed been aimed at a threat all along. Of course trying to justify it in terms of military needs is almost an exercise in futility. Security, from the perspective of Japanese security policy, is not about military strength. It is about the viability of the

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[2]Katzenstein and Ōkawara, 150.

national economy, the competitiveness of domestic industries, and the strength of the country's technology base. Japan's strategy for preserving its national security is aimed at a threat, but it is not the kind that will likely come flying across the border dropping bombs. The threat is economic decline. Put another way, the threat is technological inferiority that leads to economic decline. The battlefields where Japan's security strategy is put to the test are the marketplaces of the world. If its strategy fails, technologically superior foreign industries will occupy the market both at home and abroad. If it succeeds, Japan will be able to fend off its technological foes and help to secure its future economic health.

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